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Authors alone are responsible for opinions published in the Journal.

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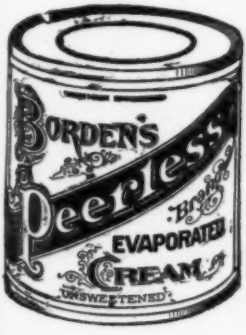

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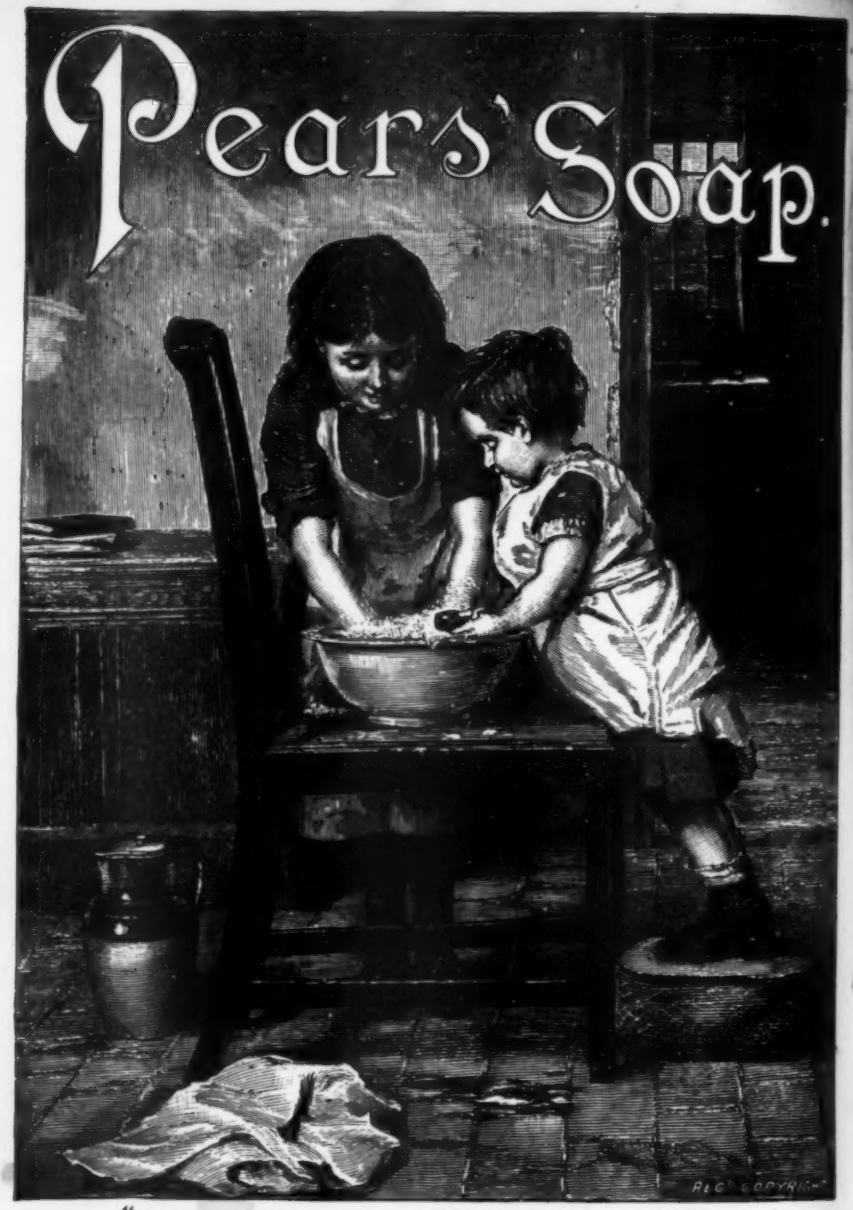

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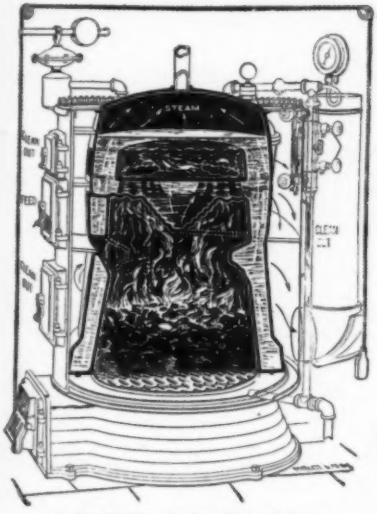

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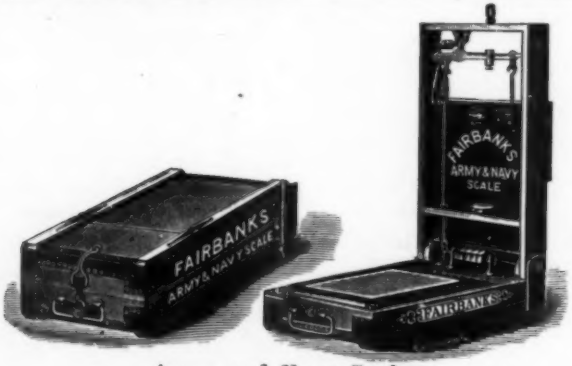

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VOL. XV. SEPTEMBER, 1894. NO. LXXI.

THE NATIONAL GUARD.—WHAT IT IS AND ITS USE.

BY COLONEL JAMES M. RICE, GEN. INS. R. P., ILLINOIS N. G.

THE American government rests on four corner stones,—the town meeting, the church, the militia and the schools. So said John Adams, one of the builders of our nation, and his saying has almost become an axiom of American statesmanship.

The meaning of the word "militia" has been very much confused by legislation. When Congress or the Legislature of a State mentions certain troops or classes of citizens as being "the militia," the people learn to understand the word as thus used and are misled as to its constitutional meaning. Particular names have sometimes been given to certain organizations of State troops and the word "militia" used to include the rest of the people who were liable to military duty under existing laws. This really never was the meaning of the word. The people that are physically capable of military service are properly designated the *levée en masse*. If not organized and drilled, they do not come within the proper meaning of the word "militia," and never did in any of its various senses. They are only material out of which militia may be made. It is important to learn who are militia and who not, for special constitutional provisions and special laws apply to them.

The American Encyclopedia, in an article written by Judge Thomas M. Cooley, the great expounder of constitutional law,

defines militia to be "A body of armed citizens trained to military duty, who may be called out in certain cases, but may not be kept in service like standing armies in time of peace. It differs from the *levée en masse* in having a regular organization at all times. Something equivalent to a militia seems to have existed in England in the time of the Saxons. * * * But it was not until 1757, when a bill to reconstruct the militia was passed, that the force acquired much vitality. * * * The able-bodied men of each parish between the ages of eighteen and thirty-five are enrolled annually, and by ballot, a certain required number are to be selected for service. * * * Substitutes may be accepted for the men chosen by ballot, and for many years it has been customary to suspend the ballot and make up the required number by volunteering. * * * Their pay while in the service is the same as that in the regular army."

Blackstone, who wrote in 1765, more than twenty years before the adoption of our Constitution, and who was well read and understood by the framers of our government, says:—

"The general scheme of the militia laws is to discipline *a certain number of the inhabitants* of every county, *chosen by lot* for three years. * * * They are to be exercised at stated times; and their discipline in general is liberal and easy; but when drawn out into actual service, they are subject to the rigors of martial law, as necessary to keep them in order. This is the constitutional security which our laws have provided for the public peace, and for protecting the realm against foreign and domestic violence." *

It will be seen by this that even in Blackstone's day the scheme of the militia laws was towards disciplining a *certain number* of the inhabitants, while the contemplation of the law was, that if a sufficient number to keep up the militia organizations to the desired standard did not volunteer, they might be chosen by lot.† The fact was they did volunteer and the lot was not resorted to. Judge Cooley in a note to the above statement of Blackstone's says:—"The major part of the militia in England now consists of trained and disciplined volunteer organizations." This is the definition of militia that must have been in the minds of the framers of the Constitution.‡

* Blackstone, Vol. 1, p. 412.

† See also Story on the Constitution, Sec. 1207.

‡ Regulations of the Militia, 1886. English War Office, Sec. 145–157.

Unfortunately the first Act of Congress for organizing and disciplining the militia was passed for the purpose of massing the entire strength of the young nation for an immediately impending war with a great and powerful enemy, and provided that nearly the whole population should be forced into the militia, a thing probably not contemplated at the time of the adoption of the Constitution, and which would have been known to be impracticable in a time of reasonably assured peace. This act, defining who should, in that emergency, be put into the militia has had an influence on the popular mind, causing it to believe, in some cases, that the militia are the class of people which this act was intended to organize into militia.

The legal and constitutional status of troops is not affected by the way in which they are gotten into their respective services. The method of putting men into the militia, whether by draft, lot, conscription, substitution or by voluntary enrollment, has nothing to do with the character of the troops or with their standing after they are in the service, does not increase or decrease their rights or privileges in any way, nor does it increase the right or authority of those in command to control them. Men gotten into the army by all these various means, may be put side by side in the same platoon, and treated in all respects alike. The same is true of those in the militia or National Guard service.

The decisions of the courts all concur with the definitions given by the text-writers and lexicographers. In the case of Dunn vs. the People, tried in the Supreme Court of the State of Illinois, A. D. 1879, the question was directly raised before the court, whether or not the Illinois National Guard came within the constitutional definition of militia, and the court held: "Our understanding is, the organization of the active militia (*i. e.*, the Illinois National Guard) of the State conforms exactly to the definitions usually given of militia. Lexicographers and others define militia, and so the common understanding is, to be a body of armed citizens trained for military duty, who may be called out in certain cases, but may not be kept in active service like standing armies in time of peace. That is the case as to the active militia in this State."

The decisions of the Supreme Courts of almost all the states contain cases in which the sentences of State courts-martial of voluntary militia organizations have been sustained as those of true and valid courts under the Constitution, when they have tried

and convicted members, under circumstances when this could not have been done except on the theory that these voluntary organizations were a part of the regular militia of the country, and that the militia courts, convened by them, were a part of the inherited "due process of law" without which no man can be deprived of his liberty or his property. These courts-martial could not have been sustained as civil courts, because in all civil courts the parties are entitled to a trial by jury, which is never the case in trials by courts-martial.

It appears that in England at the time of the adoption of our Constitution there were separate organizations similar in many respects to what we now call our National Guard. There were many organizations of a similar character existing in this country at the time of the Declaration of Independence, and also at the time of the adoption of our Constitution. I have a copy of the constitution and by-laws of an organization of such a character, consisting of 4500 men, which was in existence at the time of the Declaration of Independence. The old Minute Men, of which Israel Putnam was an officer, were very similar to our present National Guard.

The first order that was ever issued by the War Department to call out the militia, was issued for the purpose of suppressing the Whisky Insurrection in western Pennsylvania, and in this order the governors of States were especially notified that, so far as possible, they should send their volunteer organizations, the general government believing then that these organizations would be more efficient than the less disciplined and less thoroughly trained part of the general militia, but still at the same time treating them and considering them as a part of the militia and subject, as such, to be ordered out by the governors of the States.

The first Act of Congress providing for the organization of the militia of the several States, recognized the existence of these special corps and authorized their continuance as a part of the militia, subject to orders the same as the rest.

In order to understand the legal and constitutional standing of the National Guard properly one should not only look to the Constitution itself, but also to the political principles which underlie it, and examine the subject historically in order to learn the meaning of words and phrases at the time that document was written.

Our forefathers of a hundred years ago probably knew more

of the principles which underlie civil and political, as well as religious liberty, than any other population of equal numbers that had ever existed in the world before. They had left their homes and crossed what was then an almost impassable sea, solely that they might establish themselves in a land of freedom and self-government. They had made a study of this subject all their lives, as their fathers had before them, and they had just passed through a few generations of experience that impressed the importance of their principles very clearly upon their minds. They knew that a government to be free must be a government of law, and not a personal one.

A personal government, if exactly the right individual is supreme, is in many respects more prompt in action and more vigorous in execution, than a government of law and institutions can be. But no assurance can be had that the supreme ruler will always be thoroughly conscientious and unselfish, as well as wise.

An institutional government is one whose powers are vested in several officers and organizations independent of each other. This is done in various ways, and as this is the only kind of government that can permanently secure freedom and protection at the same time, it is worth while to think of it a little.

Our fathers separated the Church from the State, a thing that had not been done before. In this they benefitted both Church and State, purifying the one and liberalizing the other.

Another important step was to organize a general government to attend to the political affairs of the people, defend them against the actions of the outside world, and secure to them the operation of their State and municipal local governments at home.

At the time our Constitution was adopted, or at least at the time our confederation was formed, each colony, having renounced the sovereignty of Great Britain, was an independent nation. These independent nations, adopting first the Articles of Confederation, and then the Constitution, surrendered to the general government such power as they deemed to be necessary for the public safety, and reserved the balance to themselves. Here we come to a question which has excited a great deal of acrimonious discussion: the question as to the sovereignty of the nation or the State.

Our brethren of the South insisted strongly on the sovereignty

of the nation and sought under the National Constitution to extend their peculiar institution over all the territories of the general government; and we may well believe from the decisions they had secured from the courts and from the action of the executive, that if they had not been prevented by losing control, they would have carried slavery throughout all the Northern States by virtue of the authority of the general government which they were then extending wider and farther than any one ever thought of extending it before or since. Having lost control, they immediately took the other course and attempted to narrow the federal authority. And so it has ever been in our government and in all governments, and so, I suppose, it will ever be. It is the nature of those in power to extend that power.

"And och, mankind is unco' weak,
And little to be trusted,
If self the wavering balance shakes
'Tis rarely right adjusted."

The fact is the people of the United States are the sovereign, and the various governments, State, national and municipal, are their various appointed agents, each in its sphere, to do their bidding. They have wisely thought best not to intrust too much power to any one agent, but to divide it between different agencies, reserving the supreme control to themselves. Our fathers knew full well by the study of history, as well as by severe experience, that where too much is entrusted to one agent, that agent itself seeks to become sovereign. The servant endeavors to govern the master. They therefore adopted the agency of the national government for some purposes. In the national government they have appointed a certain class of agents to make the laws; another class to decide on the application of the laws; and still another class to attend to their execution. And they have even sub-divided their duties, for they have provided that the Legislature shall not all meet in one body, but some of the legislators shall meet in one chamber of the State House or Capitol; another body of legislators, acting independently, shall meet in another chamber. All communications between the two are in writing only, and no act shall be deemed valid unless passed by both. They have even sub-divided the duties of those who shall administer the laws. They allow one body of their servants, the judges, to determine what the law is. They have another

body of their servants, the jury, to determine what the facts are. Their various servants in the State government have each likewise their separate duties assigned them. Thus our fathers sought to protect themselves from the tyranny of a government consisting of one man, or one body of men. It is said of Frederick the Great that, at one time, in conversation with a brother sovereign he said he had only one lawyer in his realm, and on his return he intended there should be one less His objection to the lawyer and the law was that they stood in the way of his imperial personal will.

We have no sympathy whatever with those who seem to think that the State government must have a military force of its own, with which to fight the National Government in case of a disagreement; but we should have the very strongest sympathy with those who desire to prevent the concentration, not of power, but of administration, influence and patronage in the general government.

The creation of great power in the chief executive of the nation, as in the case of authorizing him, when his wisdom so dictates, and for purposes the existence of which he is the sole judge, to call out the whole power of the people, may be and is necessary for the life of the nation. The centralization of the administration is a very different thing, is not necessary and is very much more dangerous, as our own experience teaches us every day. This difference must always be borne in mind and centralization of administration prevented by every possible means.

It is the tendency of nations as they grow older to become more centralized, and this congestion of the heart, as it may be called, seems to be the precursor of their decline and fall. The life of the nation, like the life of the individual, seems to be determined by the length of time during which it is possible to keep up the circulation in the extremities. The wisdom of our fathers who founded our government is in no respect more admirably shown than in the provisions which they have made to accomplish this purpose, and especially in those in regard to the militia and the army.

There is no limit to the size of the army which the general government is authorized to raise and support, and this is not because our fathers did not have a certain jealousy with regard to a large standing army, but because they saw that the duty that might be required of a standing army and the strength of the

forces it might be required to contend with could not be foreseen, and that the size of it could be governed only by the necessities of the case. The manner of its organization and the methods which should be used to secure its development to the proper size are left entirely to the wisdom, patriotism and judgment of the officers of the general government representing the sovereign people for the time being.

They have, however, made one limitation. While they could not safely limit the size of the army without imperilling the existence of the nation, in order to prevent the executive branch from becoming independent of the legislative, they have provided that no appropriation for the army should be made for more than two years at a time, and it is manifest from reading the debates that appropriations would have been limited to one year at a time, as it was then and is now in England, had it not been necessary to make the appropriation for two years to avoid an annual session of Congress. Thus we see they have provided that even in the general government it requires the independent action of both its executive and legislative branches, each acting in its own sphere, to continue an army for more than two years.

Each separate colony, at the time of the adoption of the Constitution, had entire control of its own military forces. By the law of nature, which is irrevocable, irresistible and unchangeable, every nation must, in an emergency, have the absolute control of its entire possible military force, consisting of every man that is able to bear arms. This was the condition of each colony at the time of the adoption of our Constitution. They surrendered, as we shall see, to the general government the power to raise armies and support them, and they excluded themselves by express provision from this right. They did not surrender to the general government, but they especially reserved to the States, the control of the militia forces at all times except when wanted to execute the laws of the Union, suppress insurrection and repel invasion.

Montesquieu, who wrote several decades before the adoption of the Constitution, in his "Analysis of the Spirit of the Laws," says that where considerable armies have not converted the government into a despotism, "it is because the armies have been kept divided. It is because it was composed of several bodies that depended each on a particular province."* This is mani-

* Montesquieu's Spirit of the Laws, Book II., Chap. vi., p. 186.

festly what the founders of our government desired to secure in placing the militia under the control of the several States. It was done, not alone as a concession to the militia, and it is not a matter which the militia can waive by their consent, or by voluntary action. Neither is it a matter of States' rights which any State can waive in any way. It is a constitutional provision for the protection of the people against a centralized, which inevitably leads to a personal and tyrannical government, and the provision can only be set aside by the people by an amendment of the Constitution which shall abolish it; and, judging by the writings of all statesmen who have loved freedom, as well as by the lessons of all history, it would be injurious to free institutions if such an amendment should ever be adopted.*

The theory of all military organization is centralization,—one-man power,—exactly the opposite to that of a free civil government, and it is naturally and unalterably so. A battle or a campaign progresses so rapidly that counsel or advice with numbers is sure destruction. Action must be instantaneous and often must be secret. The one-man power and subordination can alone win victory in war.

On the other hand, these habits of mind and action are very dangerous to, if not absolutely subversive of, free civil government, if allowed to go too far under one organization. Therefore, in order to develop a strong and efficient military organization and discipline, and not threaten civil liberty, our fathers devised one military power for the general government and one for each State in time of peace, making now more than forty in all. Power was granted to the general government instantly to unite them all when necessary in order to execute the laws of the Union, suppress insurrection and repel invasion. This is according to the plan suggested by Montesquieu in his "Spirit of the Laws," as the only successful one.

With these foundation principles, as an explanation of what was intended by the framers of the Constitution and of what their object was in making the constitutional provisions they did, we are prepared to examine the provisions themselves.

* To this effect are the writings of Francis Lieber, before referred to, Chap. 34 of his Civil Liberty and Self-Government, pp. 389 to 398. De Tocqueville's Democracy in America, Part 2, Chap. 24, p. 293. Blackstone, Book I. p. 413. This subject is fully discussed also in Lieber's Civil Liberty and Self-Government, Chap. 2, pp. 113 to 120, which should be carefully studied in this connection. United States *vs.* Cruikshank et al, 92 U. S. Reports, pp. 549, 551.

The powers of Congress are, among other things, as follows: "To raise and support armies, but no appropriation of money to that use shall be for a longer time than two years; to provide and maintain a navy; to make rules for the government and regulation of the land and naval forces; to provide for calling forth the militia to execute the laws of the Union, suppress insurrection and repel invasion; To provide for organizing, arming and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers and the authority of training the militia according to the discipline prescribed by Congress." The Constitution of the United States further states that "No State shall without the consent of Congress * * * keep troops or ships of war in time of peace. * * * The President shall be Commander-in-chief of the Army and Navy of the United States, and of the militia of the several States when called into the service of the United States." The Second Amendment declares "A well-regulated militia, being necessary to the security of a free State, the right of the people to bear arms shall not be infringed." "Powers not delegated to the United States by the Constitution or prohibited by it to the States, are reserved to the States respectively, or to the people."

The general government is authorized to provide for the organizing and disciplining of the militia at all times, but it is not authorized to either organize or discipline them itself, and doing and providing for doing are very different, though often confounded. We may illustrate the difference between providing that a thing be done and doing it. A legislature may provide that when any person is proven to be the author of a certain act he shall be hung. The legislature cannot try him. It cannot order him to be hung. The sovereign people have provided that courts shall try him, and when the judge and the jury have tried the criminal and found him guilty, none of them can hang him. If any of them should do it, they would be guilty of murder. The hanging must be done by an officer of the executive branch of the government.

Thus it is with our national laws governing the militia. The National Legislature may make them. The State Executive and State courts only can carry them out, and with this execution of the law the National Legislature would have no more right to

interfere than the State Legislature would have to try a prisoner and order the sheriff to hang him or commit him to the penitentiary.

Each branch of the Government has its functions which it can discharge and no other. Each officer of each branch has his duties to perform, and no more. Each officer and each corps of officers in each government have their particular functions to perform as the servants of the sovereign people. The consent of the militia can no more remove the limitation upon the power of the general government over it in time of peace than the consent of the judge could authorize the sheriff to try a case or the consent of a sheriff authorize a legislator to arrest a prisoner. These limitations were not made for the benefit of the militia or of the State governments, but for the protection of the people against a centralized government. The consent and concurrence of the National Guard would only add to and make more manifest the evils these constitutional provisions were intended to prevent.

The evils that were feared were not alone that the army would, with force and arms, take possession of the Government or dictate terms to it; it was the transferring of the centres of administration influence and prestige in time of peace to the national capital as well as to national officers, and reducing the States to the condition of mere provinces politically and socially, that was feared as much as anything. It is a sad time for free institutions when citizens feel that their prosperity and recognition at home depend upon their influence at the national capital. The people are sure to find themselves more or less left out of consideration in such cases, except as the cabal may consider how they may mislead them and use them to their own advantage.

Another serious objection to permitting the general government to control the militia in time of peace, or appoint the officers in time of war, is that it would ruin the National Guard. Active, capable and energetic officers are necessary in a military organization, and all the subordinate officers must feel that they are in the line of promotion and will have justice done them so far at least that they are not excluded from the highest and most honorable positions by law. If they cannot be made to feel so, such men, at least, will never enter the National Guard or remain in it.

Some question has arisen as to what constitutes the difference between the militia and the army. The entire military force, upon which we rely for the defense of this country against foreign

and domestic foes and for the enforcement of the laws, is divided into two separate and distinct classes, and only two, by the Constitution of the United States. These are the army, which is authorized to be raised and supported by Congress, and the militia, which is designated in the Constitution as "The Militia of the several States," and is controlled, regulated and commanded by the several States, except when called forth to execute the laws of the Union, suppress insurrection and repel invasion. All military forces in this country belong to one or the other of these classes, the army or the militia.

The militia is a State force. In the proposition for a United States Constitution presented by Mr. Pinkney, representing the Virginia Militia plan, the militia was called the militia of the United States. The next time the provision appeared it was called the "militia of the several States," and in all other amendments that were proposed it was called the militia of the several States, and in time of peace, it is, in fact, the militia of each separate State and is so called in the present United States Constitution.

Winthrop, in his "Military Law," says "By a *regular* army is to be understood the permanent military establishment as especially distinguished from *volunteers* or *militia* in the Federal service. These two contingents, volunteers and militia, are indeed quite distinct from each other; the former, as will be further illustrated in the next chapter, being for the time equally with the regulars, a part of the army of the United States, while the latter, though in the employment of the nation, are State troops." * This being the case, those who volunteer in the service of the United States, are a part of the army of the United States, and not subject to any control by the States except so far as Congress is willing to permit it. During our late war Congress did permit volunteer officers to be commissioned by the governors of States as well as the President of the United States. Most of them were, in fact, commissioned by the governors of their respective States, though a large number were commissioned directly by the President. Congress had the right to say that they must all be appointed, as well as commissioned by him, and, in view of the fact that they were strictly national and not State troops, it would have been more consistent, although the fact that these volunteers, and men who were drafted for the service of the

* P. 84, 102 and 103.]

United States, stood precisely on the same constitutional footing as the regular army, and were under the control of the general government, did not require that they should be controlled by precisely the same laws rules and regulations and articles of war.

The general government, having exclusive control of its army, may, in its discretion, undoubtedly provide different rules and discipline for the different corps. It did not do so during our late war, except to provide that officers and soldiers in service for the war (that is volunteer officers, so called) should not be tried by a court-martial composed of officers of what was called the regular, that is the standing army. *

The power of the United States Government over the militia of the several States is restricted to the specific objects mentioned in the United States Constitution. For all other purposes the militia remains as before the formation of the United States, subject to the State authorities. The control of the individual States over their militia is not derived from the Constitution. They always had it, and have it yet so far as not given up. † The power of the general government over the militia is different in time of peace from what it is in time of invasion. We will consider it first in time of peace.

Judge Story says: "It is almost too plain for argument that the power here given to Congress over the militia is of a limited nature, and confined to the objects specified in these clauses, and that in all other respects and for all other purposes the militia are subject to the control and government of the State authorities. * * * What these powers are must depend upon their own constitutions, and what is not taken away by the Constitution of the United States must be considered as retained by the States or the people." ‡ Then he goes on to show that Congress may make such laws as in its judgment seem wise, to provide for

* The United States may draft men into the regular army, and did do it; see *Ex Parte* Coupland, 26th Texas, 393, 394, 396, 397, 405. Kneedler vs. Lane, 45th Penn. State, 253, 278, 279, 284, 285. See Strong's opinion also in the same case, and the multitude of authorities cited by him. A soldier, whether he goes into the army or militia, voluntarily, for bounty, as a substitute or by conscription, does not and cannot be allowed to change his character or duties while there on this account: See *Ex Parte* Coupland, 26th Texas, 402, and the remarks of Mr. Grundy and Mr. Cheeves, 4th Elliott's Debates, 459. See also McCall's Case, 5th Phila., 259. An army obtained by conscription is not the militia, though drafted from it: See Cooley's Principles of Constitutional Law, p. 89.

† Dunn vs. The People, 94th Ill., p. 126.

‡ Opinion in the case of Houston vs. Moore, 5th Wheaton, p. 50.

organizing, arming and disciplining the militia, and that such laws as it makes for these objects will be binding upon the States, and will prevent the States from attempting any legislation that will contravene or annul these acts of Congress. But this does not prevent the States from adopting any acts that may seem to them wise even on these subjects (provided the State acts, so adopted, do not contravene any of the laws of Congress on the same subject).* He farther says: "The States, in virtue of their sovereignty, possess general authority over their own militia, and the Constitution carved out of that the specific power in certain enumerated cases, but the grant of such power is not necessarily exclusive unless the retaining of a concurrent power by the States be clearly repugnant to the grant. It does not strike me that there is any repugnancy in such concurrent power in the States."†

National legislation supersedes State only, first; by grant of exclusive power in the United States Constitution; second, where power is forbidden by the United States Constitution to the States; third, where the nature of the subjects committed to Congress is such that legislation by the State would be repugnant to, or incompatible with, the laws of Congress.‡

When Congress has adopted such legislation as shall seem to it wise for the organization,§ arming and disciplining of the militia, its power over the militia in time of peace is exhausted. And with that the authority of the general government is exhausted, for none of the officers of either the executive or judicial departments of the general government have any control over any of the militia of the several States in time of peace.

It is manifest from the limitation in the Constitution itself, that it was not the intention of the Constitution that Congress should directly or indirectly attempt the government of the militia in time of peace, or war either, except of that part of it in the service of the United States. Congress has authority to provide for governing "such parts of the militia as may be

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* Houston vs. Moore, p. 54. Bressler vs. Illinois, 116 U. S., 267 to 269.

† To the same effect see Sergeant on the Constitution, p. 321. Presser vs. Illinois, 116 U. S., 267 to 269. United States vs. Cruikshank et al, 92 U. S. Supreme Court Reports, 439, 551.

‡ Houston vs. Moore, 5th Wheaton, p. 1. Kent's Commentaries, p. 387. Passenger cases, 7th Howard, p. 283 to 573. Kent's Commentaries, 12th Lecture, p. 244 to 250. Cooley's Constitutional Limitations, p. 118. Mr. Grundy and Mr. Cheeves, 4th Elliott's Debates, p. 459 and 136. Houston vs. Moore, 5th Wheaton, 37.

§ Gray's Reports, p. 618.

employed in the service of the United States." As it has no authority over the militia except what the Constitution gives it, and the Constitution limits the conferred authority to provide for the governing of the militia to those particular troops, which may, under certain circumstances, be in the service of the United States, it is certain that according to all ordinary judicial construction Congress cannot provide for governing any other part.

The word "disciplining" is sometimes held to mean teaching, or instructing, and sometimes punishing or governing, or providing for punishment. When the Constitution declares that Congress may provide for disciplining the militia, but shall not provide for governing it, it is manifest that the word "discipline" in this connection means teaching, and not punishing or prescribing the penalties for punishing. Whatever the word may mean elsewhere, in this connection it means that kind of disciplining which is not governing. The authority to govern the militia is reserved to the States so long as it is in their service. Also by express reservation the authority remains in the States of training the militia according to the discipline (that is the system of instruction) prescribed by Congress. The object in giving the general government the authority to prescribe the discipline, that is, the system of instruction to be used by the several States in educating their militia, was that they might all understand the same discipline when they should be used together in case they were called out in the service of the United States. It may have also been in mind to have them educated in the same system of instruction that is used in the army, so that if any of them should be drafted from the militia, or should volunteer from it into the army of the United States, the instruction they had already received would qualify them for immediate service.

It is manifest that if the uniform instruction in tactics is to be of much avail, the organization of the two commands must be practically the same also. It is probably for this reason that Congress was given the authority to prescribe the organization of the militia. By this we understand that Congress may, with more or less exactness and exclusiveness, as shall seem to it wise, define the kind of organizations into which the troops shall be formed.

Congress has been given the power to provide for arming the militia in order that when called out their arms and ammunition may be of a uniform character. Otherwise it would be impossible to prevent troops being sometimes in emergencies supplied with

ammunition unfitted to their arms, and with arms with which they were unacquainted, and their usefulness and efficiency thereby destroyed.

The Constitution declares that Congress may *provide* for calling forth the militia to "execute the laws of the Union, suppress insurrection or repel invasion," but it is manifestly impossible that Congress should itself call it forth, even if in session. It is too much of a deliberative body to be charged with such a military duty as this. To determine whether or not the militia should be called out, and do it wisely, the determining power must be possessed with a certain knowledge of the existing military situation. If to repel invasion, it must know all about the strained relations existing between our Government and the invading power, which, as a matter of state policy, it would often be extremely unwise to have made public. The Executive of the Government might often be possessed of knowledge of an intended insurrection or rebellion which it would be impolitic to communicate to so large a body as Congress, whose discussions are public. This being a military power and to be exercised often with extreme promptness, and on information which it would be unwise to have made public, no one could exercise it so well as the President of the United States. He is in possession of all knowledge concerning the relations between our Government and other governments, and as Chief Executive of our nation, is charged with the enforcement of our laws and the preserving of peace and order within our borders, and in case of a resort to arms, is the Commander-in-chief of the militia in the service of the United States.

Congress under its constitutional power in this regard has from the beginning wisely clothed the President with this authority, and has made his determination as to whether or not the circumstances exist justifying the call, final and conclusive on all parties. It could not be otherwise. If the President's determination in this respect were subject to review in any court or by any other power, officers would never know whether or not they would be justified in obeying the President's call when made, and the entire militia would be placed in the position, when called by the President, of being liable to court-martial if they did not respond, provided it should appear that the call was justified; and on the other hand, it would be liable to suit for damages for what it might do, if it should be afterwards decided that the situation did not justify the call. It is absolutely necessary, therefore, to

make his decision in this matter final. The theory of our Government contemplates that presidents are elected for this purpose, and the power of determining cannot be better vested anywhere else, and the remedy of the people in case of incompetency or infidelity is in our frequently recurring elections.

If the President should order out the militia in cases where he ought not to do so, whether his action results from his weakness or his timidity, from his unfaithfulness in calling them out for one purpose under pretence of calling them out for another, or from his using wilfully the power confided to his discretion to subvert the spirit of the law, the remedy of the people would be in their elections to retire him and all his friends who counselled him in the matter to private life, and this they would most surely do. Any statute, however, that would provide for the calling out of the militia for a purpose not justified by the Constitution, would have its own invalidity manifest on its face, and any suit begun under such a law would fail.*

Congress has provided further that when the militia are called out, the order may be made directly upon the individual officers and men by the President, or may be made through the governor of each State.† The latter mode is the better, however, when practicable, just as it is better as a rule to send all military orders through the regular channels.‡

Rawle, in his work on the United States Constitution, advances the doctrine that Congress has no right to postpone the authority of the President over the militia called into the service of the United States, to any period later than the issuing of his call. He contends that the President, being the constitutional commander, has a right when these emergencies arise to command the militia instantly, and that Congress has no right to deny it to him.§ Congress has no right to deny to the President, or postpone or delay his command of such of the militia as are in the service of the United States, but he has no constitutional right to call them out except as the right is given him by an Act of Congress, and Congress may prescribe what form of muster and other ceremonies may be necessary before the persons or organi-

* Martin vs. Mott, 12th Wheaton on p. 30 to 33. Story on the Constitution, Sec. 1210, 1211.

† Rawle on the Constitution, p. 160. Martin vs. Mott, 12th Wheaton, p. 19. Story on the Constitution, 1212.

‡ McCall's Case, 5th Phila., p. 268.

§ Page 158.

zations shall be considered in the service of the United States, and in doing so may by law fix the time when the militia will pass into the control and under the jurisdiction and government of the United States, and when this time comes the States will cease to have control of them, or to have the right to govern them.* As a matter of policy, however, it would seem to be clear that Congress should provide that men and organizations called especially the organized militia should pass at once *ipso facto* into the service of the United States and consequently under the President's immediate control, from the moment this call is issued and the particular troops are designated, without waiting for any form of rendezvousing, mustering or re-mustering, thus, as a legal question, at once determining the jurisdiction and authority to govern them, and also as a military measure facilitating their prompt mobilization and the putting of them in the proper place to defend the life of the nation and maintain its laws at a time when success itself may depend upon celerity.†

Every citizen of a country is by nature bound to defend that country in time of need. Vattel, one of the greatest writers on the natural rights of citizens and the duties of states, who wrote in 1758, says: "Every cititzen is bound to serve and defend the State so far as he is capable. Society cannot otherwise be maintained, and this concurrence for common defense is one of the principal objects of every political association. Every man capable of bearing arms should take them up at the first order of him who has the power of making war. In former times and especially in small States, immediately on a declaration of war, every man became a soldier. * * * No person is naturally exempt from taking up arms in defense of the State, the obligation of every member of society being the same."‡ The executive authority of a nation is clothed with the authority to order citizens of that nation to immediate military service by the law of nature, in so imperative a manner that it would be almost impossible to make any human constitution that should deprive him of this right. Neither the Constitution of our States or of the

* Houston vs. Moore, 5th Wheaton, p. 17, 20 and 21. McCall's Case, 5th Phila., 262. Story on the Constitution, 1213.

†Houston vs. Moore, 5th Wheaton, 20 and 21. Story's Opinion in 5th Wheaton, 56, 57, 61 and 62. Rawle on the Constitution, 158 and 160. Sergeant's Constitutional Law, 331. McCall's Case, 5th Phila., 265. *Ex Parte* Coupland, 26th Texas, 394. Mills vs. Martin, 19th Johns, 7.

‡P. 394.

nation have attempted to do so, but the authorities of both state and nation are clothed with full constitutional authority to order any capable citizen at once into military service. This does not infringe any of the individual's right of personal freedom more than is necessary to maintain the rest of it. This much sacrifice of his personal rights is necessary in order to protect him in the enjoyment of his liberty at all. Otherwise he might be subjugated by foreign powers or domestic mobs or insurrections.

It is competent to provide by law that any citizen, much more a member of the organized militia, being so ordered to report for military duty, and failing to do so, may be tried by a court-martial. If the general government were compelled to resort to a civil process and fines, and, perhaps, imprisonment, for failure to report when ordered, the process would be so slow and so ineffectual that the government itself might be overthrown before the delinquent could be brought to punishment. The failure to report is a military offense pertaining to the defense of the nation in war, and should be summarily tried by a military court; and by our laws heretofore such offenses have been made punishable by courts-martial.*

The Constitution of the United States makes the President the Commander-in-chief of the militia of the several States when called into the service of the United States, and, further, provides that the authority of appointing the officers of the militia shall be reserved to the States. These provisions cannot mean that he alone in person must command the military organization of each separate State that reports to him. The object probably is to preserve each State contingent while in the service of the United States as a corporate body, preserving its organization and its autonomy. The militia, while in the service of the United States, are, as already shown, still State troops. They are the ready made military forces of the State borrowed by the general government for temporary and immediate use, and to be returned in due time to the State from whence they came with their organization complete.

It was the manifest intention that the militia organized by the States should not be disorganized or have its organization changed by the general government while it was in its service, but that the general government should use it, preserving its organization intact, except so far as it might be necessary to separate it in order

* Houston vs. Moore, p. 28 and 29, 5th Wheaton.

that it might act in two or more places at the same time. As soon as the necessities of the Government cease, the whole body should be returned complete in its organization to the State from whence it came. It may muster it out of its own service, but cannot disband it.

The provision that the appointment of officers of the militia shall be reserved to the States does not mean that no other officers shall be placed over the militia. The President, of course, as commander of the militia while in the service of the general government, would have a right to suspend any officer and relieve him from duty and allow the next in rank to take command. This is a military necessity and must be allowed, as any superior officer might temporarily relieve a colonel from the command of his regiment or a captain from the command of his company. It is not understood, however, that because a commanding officer has a right to do this, he has a right, merely on his own opinion that certain officers are more efficient than others, to remove captains and colonels and substitute others in their places as a permanent or general thing. It is the same with the authority of the President to remove or suspend the officers of the militia while in the service of the general government. In cases arising in the regular army when he removes an officer, Congress may give him authority to appoint a successor. In the case of the militia, however, unless, perhaps, it should be for a mere temporary purpose, he has not, and Congress cannot invest him with authority to appoint a successor; but the authorities of the State to which the militia belongs have this right, thereby restricting the authority of the President over the officers of the militia a great deal more than it is restricted over the officers of the army. It might seem to the President and his officers who are aiding him, that he or they could select proper officers to command the militia a great deal better than the governors of the States could do it. Nevertheless this supposition in their minds could not justify them in assuming the duties which the people in the Constitution have distinctly said should be conferred alone upon the governors. Neither the President nor any other person has a right to act contrary to the people's expressed will.

Cooley, in his Principles of Constitutional Law, page 89, says: "But, though the States have the appointment of the officers, the bodies of the militia called into the service of the United States

are subject not only to the order of the President as Commander-in-chief, but also to those of any other officer outranking their own, who may under the authority of the Commander-in-chief be placed over them."

The general government may assign them to duty with other organizations of the militia or the army, and may put the whole command and body under the command of other officers of the militia of other States or of the regular army, it being the intention, not that the militia shall not serve under other officers of the President's selection, but that they shall go with and under their own officers as a body, and in this manner report to and be commanded by such officers as the President may see fit to put in control of his military camps. There is a difference between taking the troops and removing their officers and substituting others, and taking the troops and officers together and putting them all under other officers. One disorganizes the organization; the other does not. One is constitutional; the other is not. And if the body of the militia called out should be a brigade or a division, the general government would have no more right to remove the brigade or the division officers, and to substitute others, than it would have to remove the colonels and captains of companies, and even the non-commissioned officers, and substitute different ones, which would make a different organization than that which existed at the time the call was made.

It would also be a violation of the spirit, if not the letter of the Constitution, for the general government to call out the privates of the militia and leave the non-commissioned officers to remain at home, and substitute other officers for those who were left. This would be manifestly unconstitutional. It is just as unconstitutional to draw the line at any other place, as to draw it between private and non-commissioned officers. It would be just as unconstitutional to leave the brigade commander and his staff and take the regiments with their organizations, as it would be to leave the regimental organizations and take the companies with their officers.

It was sought by Mr. Madison at one time to have a provision engrafted into the Constitution, limiting the right of States to appoint their officers to the appointment of lieutenant colonels and others below that rank. His proposition failed to pass in the convention. Madison at this time was a Federalist, who believed in a centralized national government, and a practical obliteration,

almost, of the States. At this time he favored giving to Congress a veto power over all laws to be passed by the State Legislatures. He afterwards changed his mind and went over to the other party, called then the Republican Party, who were advocating a republican form of government, preserving as far as possible the autonomy of the States.

Washington at the time of the Whisky Insurrection, when the militia of the states of Pennsylvania, Virginia, New Jersey and Maryland were called out, left the command of all the militia during his absence to the Governor of Virginia as his representative.*

The militia in the service of the United States or of their own State is one and the same organization under the same officers.†

If a citizen, liable to military duty, is ordered into the regular army of the general government, it would be proper that a court-martial for his trial should consist of officers of the regular army, that is of the military body to which he is ordered. If, on the other hand, he should be ordered out as a member of the organized militia of any State, whether in the service of the State or the general government, it would seem to be proper that he should be tried only by militia officers.

The Constitution of the general government providing that the officers of the militia shall be appointed by the States, a member of the militia would have a constitutional right to be commanded and governed by officers appointed over him in the constitutional way; and the trial by a court-martial is part of the duty which the officers are required to perform, and one of the most important parts, as far as the delinquent is concerned. It is true that the government of the militia, while in the service of the National Government, is given over to that government, but this is with the limitation that the appointment of the officers is reserved, even in these circumstances, to the States, and this section would effect the selection of officers to try and punish as well as command them. Hence it would seem to be constitutionally necessary that these courts-martial should consist of

* *Ex Parte* Coupland, 26th Texas, 395, 387, 401. The American Encyclopedia Militia Article by Judge Cooley, p. 441. Rawle on the Constitution, 193, 194. Also 111 and 112 Pascal's Annotated Constitution, Note 3 to Section 1215. See also Sections 1207 and 1491. Note 2, 4th Elliott's Debates, 459. Houston vs. Moore, 5th Wheaton, 50 and 51.

† 14th Gray, 617, I. Kent's Commentaries, 262, 263. 8th Mass. 548 to 555. Story on the Constitution, 1205.

officers of the militia.* And this has always been the law so far. Congress has always been careful in enacting laws of this sort to provide that courts-martial for the trial of militia should not consist of regular army officers. It was even provided during our late war that courts-martial for the trial of what were called volunteers should not be composed of regular officers, so called, and this notwithstanding the fact that the volunteer officers stood in the same constitutional position as the regular army officers.† There being no constitutional reason for this provision of law so far as the volunteer officers were concerned, it could have only had its foundation in the minds of the legislators in the belief that the theory of government and discipline of the volunteers was properly more liberal and easy, as Blackstone says, than that of the regular army. Still more would this be true with reference to the militia, so that reason requires that courts for the trial of the militia should consist of militia officers only. This reservation under the law in favor of volunteer officers that they might be tried by courts composed, not of regular officers, is the only legal distinction made between them and other officers of the army of the United States.

The theory on which a militia man may be tried by a court-martial for failing to respond to an order to assemble for duty, is that the order places him, as well as his comrades who do report, instantly in the service of the Government, as it has a right to do; and if the law provides for this, he is therefore to be tried by the same court and in the same way that he would be tried if he had reported and then absented himself without leave.‡

In the earliest organization of our militia it was much more desirable and practicable to have all the citizens who were capable of bearing arms incorporated into it. At that time almost the whole country was Indian frontier. Indian raids were liable to be made at any time, and when made it was reasonable that the whole population of the particular neighborhood capable of offering resistance should at once rally to the defense of the settlement. The suddenness of the attacks, the distance the settlements were apart, and the lack of the means of transportation at

* Martin vs. Mott, 12th Wheaton, 33 and 34. Vanderheyden vs. Young, 11th Johnson, p. 150.

† Winthrop's Military Law, p. 85.

‡ See Kneedler and Others vs. Lane and Others, 45th Penn. State, p. 261. Vanderheyden vs. Young, 11th Johnson, p. 150.

that time, prevented the people of one neighborhood from supporting those of another. These reasons have continually become less and less important from that day to this.

The earliest militia legislation of the general government was very frequently for defense against the Indians. The first act was that of September 29, 1789. The next, April 30, 1790. March 3, 1791, the President was authorized to increase the army by the enlistment of 2000 troops for six months, and at the same time was authorized to call out the militia infantry. March 5, 1792, he was authorized to protect the Indian frontier by the appointment of four militia brigadier generals. This act was unconstitutional and of no effect. May 2, 1792, he was authorized to call out such and as many militia as he deemed necessary.

Up to that time no attempt had been made on the part of the general government to make any provision for organizing, arming and disciplining the militia. This was done by the act of May 8, 1792. On March 20, 1794, the President was authorized to fortify certain harbors and to raise regular troops to defend them. May 9, 1794, a corps of artillery and engineers was authorized. On the same day an act was adopted by which the President was authorized to require the different States to organize and equip, according to law, and hold in readiness to march at a moment's warning, 80,000 militia, which were, by the act, apportioned to the different States. The authorities of the various States were required to officer these militia.

Congress has no constitutional right to require the States to do these things, and nothing was done under the act. It expired by limitation. The same act was substantially reënacted June 19, 1807. This act was unconstitutional and inoperative for the same reason. The only remedy the general government has in case the different States will not develop their militia, is to develop and enlarge the army. This act also expired by limitation. On May 28, 1789, an act was passed by which the President was authorized to increase the army to 10,000 men, and to offer bounties and to organize these troops with a suitable number of major generals, etc. They were to be enlisted for three years, to be on the same footing as other troops in the U. S. Army.

Among other provisions which were valid in this act, there was an unconstitutional provision which called for the organization of a sort of national militia.* They were not to be part of

*Sec. 3 of the act.

the army, because they were not sworn into the service of the United States. They were in all respects to be militia, except that the President was authorized to appoint all of the commissioned officers. These provisions of this act, authorizing the officers of this provisional militia to be appointed by the President, were pronounced undoubtedly unconstitutional and dangerous to the country. Nothing was ever done under the unconstitutional part of this act, except possibly to commission some of the officers who were never assigned to duty, and this unconstitutional part was repealed March 16, 1802.*

Except as to the appointment of officers or the breaking up of the organization, which is the same in effect, the general government, while it has the militia in its service, has the same control over it in all respects, to command, pay and support it, that it has over the army. It has, however, been doubted by some whether it has the right to send it out of the United States in case of war. There is nothing in the Constitution of the United States expressly or by implication limiting the service of the militia to the boundaries of the United States. It is provided that the militia may not be called out except to execute the laws of the Union, suppress insurrection and repel invasion. It will be observed, however, that the constitutional limitation is not as to the place where the militia shall serve, but as to the circumstances which make it proper for the general government to call for their services at all. If these circumstances do not exist, the general government may not constitutionally call for the militia to serve even in their own State, and when these constitutional circumstances do exist, the general government is authorized to call upon the militia, and no limitation is given as to where they shall fight. The constitutional provisions are not intended to control the military movements of the militia when in service, a thing which could only be well done by the military officers. The plan of the campaign, whether defensive or offensive, is not interfered with. The Constitution of the United States is not intended to be a military document. Its provisions are for the protection of the citizens and for the preserving in the best form the civil government, not for the ordering of military campaigns. It was deemed unwise to allow the general government to have control over or to command the militia in time of peace and quiet, because it was thought that the good of the civil government required

* See appendix to Ticker's Blackstone, vol. 1, p. 274.

this limitation. The reason limiting the control of the general government over the militia, except that it must not disorganize it or change its officers, ceases when it is called into the service of the general government for constitutional purposes, and when the reason for the limitation ceases, the limitation itself should cease, on the well-known principle of law, *cessante ratione*, etc.

Perhaps those who hold that militia cannot be ordered beyond the limits of the United States are led to do so because there was an English law that the militia should not be ordered out of the realm. This law, in the case of England, was to prevent the sovereigns from using the English militia to maintain their kingly authority in their inherited provinces on the continent of Europe, provinces in which the English people themselves had no interest, they not being a part of the English government, but separate inheritances of the kings. These reasons for this rule in the United States never did and never can exist, as a President of the United States can never inherit in his own right a sovereign authority over a foreign territory for the maintenance of which he would be inclined to use the militia of the several States. There being, therefore, no reason why the militia should not be sent out of the United States, and no constitutional provision that they should not, it would seem to be reasonable that the President should have a right to send them out, if this were in his judgment the proper military way to execute the laws of the Union, suppress insurrection or repel invasion. There have been instances where the militia have refused to march out of the boundaries of the United States. This was, probably, because their officers were not thoroughly versed in the rights of the Government, and had their erroneous impressions formed in the way herein accounted for. It would seem to me that the President of the United States, on proper occasion, while using the militia for the purpose for which it was called out, would have a right to order them outside of the boundaries of the United States, and they ought to go and would be subject to court-martial if they did not. *

Thus it will be seen that the people are sovereign over all

* Rawle in his Constitution of the United States on p. 160 holds that the militia may be sent out of the United States on proper occasions. Story in his opinion in Kneedler vs. Lane, 45th Penn. State, p. 276, 277, seems to hold the contrary. The contrary is also held in *Ex Parte* Coupland, 26th Texas, 398, 441. But in both these decisions, 45th Penn., 26th Texas, the question did not directly arise and was not directly decided, but was only used in argument as a sort of an *obiter dictum*.

governments and institutions of government in this country, and our State and national governments are instruments by which the people govern themselves, and express and execute their will. In fact the State and national governments with the county, city and township governments, all taken together, form only one government. This division of duties, giving each officer his particular work to perform, has always been looked upon by the most profound statesmen as the surest and firmest foundation of civil liberty and self-government. In fact it has been considered indispensable to that end, and history teaches us that whenever these various classes of duties are assumed by one body or one man, whether by law or not, the liberties of the people are gone.

The National Guard or volunteer militia, besides being thoroughly in accord with the spirit of our free institutions, is a very economical force. A part of the expense is generally paid by the States, a much smaller part by the general government, and the rest is paid by the members of the National Guard or volunteer militia themselves. The amount paid by both the Federal and State governments combined will average about 3 per cent. of the cost of an equal number of troops in the regular army or of an equal number of policemen in our city, while these volunteers stand always ready at a moment's notice to efficiently assist either one in case of need.

There is nothing in the Constitution to prevent the people, through the organization of the general government, from raising money to be expended upon the militia by the proper State officers in charge of them, or from turning over material it has purchased with the money it has raised to these officers, to be used by the militia and held by them in trust for the general government as a loan, the same as an officer of our civil government may collect the taxes to be expended by another set of civil officers in improving our roads and building court houses. At the same time the collector of the money has nothing to do with the spending of it. The tax collector would have no right to call upon a contractor who is building the court house, and tell him he must build it this way or that. That would be outside of the duties of the tax collector. And so it is with the officers of the general government. It is their duty to attend to those functions of government which the Constitution says they shall, and leave to the State officers the discharge of the duties prescribed for them. We speak of the Federal Government and the State Government

but they are merely organized parts, each with clearly defined duties, and all, when taken together, constitute the one great institutional government of freemen, known as the United States of America, a government of the people, by the people and for the people.

The militia is and should be a great power. For the organization, support and command of it the founders of our Government have made most careful and wise provisions, as is apparent by a thorough study of the subject. With unprecedented forethought and knowledge of political science, the fathers have provided for its greatest usefulness and power for good in times of need, and its most safe administration and a control least harmful to the civil affairs in times of peace, which are consistent with an efficient and effective military organization. In times of danger the militia may all be, by a single order of the President, instantly put under the sole command of the President; and in times of peace it consists of separate organizations under the separate command and control of the different States, and in no way controlling the general government or being controlled by it; and both State and national government are expected at all times to contribute to its support and maintenance.

THE CARE OF THE WOUNDED IN TIME OF WAR.*

By JUNIUS L. POWELL, M. D., Captain Medical Department, U. S. Army.

THE Act approved March 1, 1887, entitled an "Act to organize the Hospital Corps of the Army of the United States," was a radical departure from ancient and obsolete methods, and like every other innovation upon old and accepted usage, has had to pass through various stages of experimentation and evolution before being perfected in all the details essential to efficiency and successful operation.

While it is true that there are some points still *sub judice*, points upon which there is a pronounced diversity of opinion, it is believed that the wisdom of the measure is now universally conceded. It is curious, however, when we reflect, that while the necessity for such an organization existed and was recognized by many during the War of the Rebellion,—when the widest field was open for a demonstration of the practical advantages to be derived from the creation, on a permanent and independent basis, of a corps trained to care for the wounded on the field of battle,—it was not until more than a quarter of a century after the curtain had been drawn down over that great drama in the history of our country, that the ideas and recommendations of the men who then agitated the subject were permitted to take shape and materialize. To the great breadth of mind, originality and executive talent of Dr. Jonathan Letterman, Medical Director of the Army of the Potomac, are we indebted for the prototype in the scheme which has assumed definite and permanent shape by virtue of recent legislation, for it appears that, prior to his time, there were no precedents or models that had proved satisfactory, upon which he could rely for suggestions in formulating measures adapted to meet the exigencies by which the Medical Department was confronted. Legouest, a French military surgeon of experience, in a work entitled "*Chirurgie de l'Armée*" and published during the progress of our Civil War, feeling the embarrassments incident to the want of an organized force equipped and trained to care for

* Read before the National Association of Military Surgeons at Washington, May 3, 1894.

the wounded on the field, expresses himself in the following language, viz.:

"The removal of the wounded from the battle-field and their transportation to the hospital, is the most defective part of the medical service. Even now, after the great wars of the end of the last century and the beginning of the present, after the bloody battles of our own times, this important service [in the French army] is delegated to no particular person, or rather no one has been given authority or placed in position to render it. Military surgeons who have been present in various engagements, all know that when the wounded fall in the ranks, there are none, as a matter of fact, to carry them off, except their own comrades, a service as painful to one as to the other; the soldier quits the ranks, often never to return, or only after the fight is over; the number of men carrying off their comrades is rarely limited to the number really necessary, and one may sometimes see four, five, or even six soldiers conducting to a hospital a man slightly wounded and marching quite as well as his comrades."

Even Larrey and Des Gennettes, surgeons under Bonaparte, out of their vast experience, failed to leave behind them any suggestion of a system by which the evils pointed out might be corrected. Letterman's Ambulance Corps was a new departure, but the war had been in progress for more than a year before its originator was placed in a position and clothed with the authority essential to the accomplishment of the grand results that followed upon its inception. Nevertheless there was built for it and its founder, during the comparatively brief period of their service,—in the magnitude and value of the work they rendered by strengthening the hands of the general commanding in trying moments, and giving to thousands of sick and wounded prompt and efficient aid during their sufferings,—a monument to their memory that will endure as long as brilliant achievements, and devotion and courage in the performance of duty continue to elicit the applause of men.

What has been said but emphasizes the idea, which might well be accepted as axiomatic, that organization, discipline and efficiency constitute a tripod of coördinate and mutually dependent conditions upon which any military ideal must be built and ultimately stand. No man ever understood this better than Letterman. The order published from Headquarters Army of the Potomac on August 2, 1862, framed by himself and embodying the

details by which were to be carried into effect the conceptions of his gifted mind, is a model of simplicity, conciseness and directness. A distinguished French surgeon, De Salt, I believe it was, once sagely observed, that the simplicity of an operation was the measure of its perfection. The truth of this utterance is applicable, not alone to the domain of surgery, but to every device or invention, great or small, born of man's ingenuity, and Letterman was the very embodiment of the principle in point. He saw and knew only essentials in meeting the exigencies of battle, and he applied them in the simplest and shortest manner. The drill that he instituted did not go beyond "instructing his men in the most easy and expeditious method of putting men in, and taking them out of the ambulance, taking men from the ground, placing and carrying them on stretchers, observing, that the front man steps off with the left foot, and rear man with the right, etc." This was all, but it proved equal to every demand upon the stretcher-bearers in time of action, and was continued without modification, to the end. In contrast with this, are the multifarious detachment evolutions with which our most recent manual of drill for the Hospital Corps is replete, the application of which to any of the exigencies of a great battle, the only true test of their value, is to the writer's mind, exceedingly problematical. Their execution leaves upon the imagination an impression as barren in tangible results, as were the claims of the Kentucky gentleman at one of the Bourbon State fairs, who desired the committee awarding prizes to see his horse "Early." He was asked to bring him out on the turf. One of the committee asked him if he could trot? He shook his head and said "No." Another member of the committee asked if he could run? Again he replied, "No." The third and last member of the committee wanted to know if he was good under the saddle? He replied: "Saddle, hell! he's just for show."

EFFICIENCY.

The efficiency of a military organization is so inseparably linked with its equipment that any discussion of the one without the other would be essentially incomplete. The *raison d'être* in the latter case, is determined by the nature of the duties to be performed.

The Medical Department and Hospital Corps are not combatant in their functions. Their office is to save life and not to kill. They are, however, none the less military in character.

During the prevalence of war between civilized nations, according to the spirit and letter of the Geneva Convention as expressed in Articles 2 and 7, their neutrality and privileged status, in view of the work of humanity in which they are engaged, is assured and proclaimed by the emblem of the Red Cross which is worn on the left arm. Equip them as combatants and remove the Red Cross, and they cease to enjoy the protection conferred by international agreement. They must fill the rôle of the good Samaritan, or the warrior; they cannot do both. The hospital steward, U. S. Army, under existing regulations, is required to wear a ponderous cavalry sabre. The incongruity of his make up, —as the Red Cross on his left sleeve declares his calling, while his clumsy "Toledo trusty" dangles from his left hip,—is suggestive of those unclassified genera that have vexed the science of naturalists. Since, then, it does not appear that there is any object in view, the attainment of which would be in any way equivalent to the discomfort and embarrassment to freedom of movement which the aforesaid equipment inevitably entails, it must necessarily be classed among the impedimenta, and to that extent, impairs the capacity of the sanitary soldier in the proper performance of his duties.

COMPANY BEARERS.

The duties of the bearers are of a cognate character to those of the members of the Hospital Corps, but the scope of their duties and their limitations do not appear to be as distinctly stated as they should be. True, paragraph 1575 of the Regulations provides that "during an engagement the company bearers shall, under orders of their commanding officers, give first aid to the wounded or carry them to the rear, until relieved by members of the Hospital Corps," and on this same subject it is the decision of the Surgeon General, rendered June 13, 1891, that each bearer, in addition to his fighting outfit, should be equipped with "a field tourniquet and a package of dressings."

But an engagement may last a whole day, and the severer the fighting, the greater the work for the Hospital Corps, and necessity for the presence on the fighting line of every combatant unit. By taking four men from each company, forty would thus be withdrawn from each regiment, and the results for either side, in the conflict, often hang upon the presence or absence of a smaller force than this. What officer then, while fully sensible of the

demands that humanity makes upon him in behalf of his wounded comrades, would assume the responsibility of reducing the fighting strength of his command to that extent, even for the briefest period, in the face of possibilities of such momentous import?

I believe that to carry out *all* the foregoing provisions, would be putting impediments in the way of the performance of their paramount duties by the company bearers, for which there could be no possible equivalent in the benefit that would accrue to the wounded. I am of the opinion, therefore, that the office of the bearers in their service to the wounded during an engagement, should be limited to emergencies in their strictest sense, and that under no circumstances should they be ordered or permitted to leave the line of combat.

The first aid equipment, viz., a field-tourniquet and a small package of dressings, as prescribed by the Surgeon General, suggests the limit of their ability to render first aid, and in order to avoid impending death, this can be applied with such dexterity and speed as to admit of the bearers retaining close touch with the fighting line. The wounded man should then be left as comfortable as he can be made, to await the approach of the members of the Hospital Corps, who should be close at hand with the stretchers to remove him to the first dressing station. When the combat is at an end, or there is a lull in the conflict that will justify it, then the bearers may be used as auxiliaries to the Hospital Corps in taking the disabled to the rear, and to this end, the latter organization should go upon the field equipped with a sufficient number of supernumerary litters to meet the demand.

The points that I have just brought out have not, so far as I know, elicited discussion, but their importance to my mind cannot be overestimated. In the drama of war, that organization is the most perfect and is most easily and effectively handled, that has all of its members well versed in the nature and extent of their duties, and these latter cannot be too clearly and distinctly formulated to insure rapid, intelligent and efficient execution.

To us has been given the organization. How best to use it, so as to compass the greatest good to an army in the field, is the province of the military surgeon.

Finally, a word on what has been accomplished in the past one or two decades in the domain of surgery, to relieve future records of the appalling accumulation of fatal results. Limiting these remarks, for example, to the treatment of com-

pound fractures alone, of which gunshot wounds inflicted during the time of war constitutes such a vast proportion, the statistics of the present day show such a marvelous decrease in the mortality over past experience as to demand careful attention. "In Guy's Hospital from 1841 to 1861—twenty years—there was a mortality of about 28 per cent. In the Pennsylvania Hospital from 1839 to 1851—twelve years—there was a mortality of 44 per cent. In the New York Hospital during a similar period there was a mortality of 48 per cent. In the Upochow Hospital Report of St. Petersburg there was a mortality of 68 per cent."

Under modern methods Dennis* reports 681 cases of compound fractures with one death from sepsis, giving a death rate of one-seventh of one per cent. Coming now to the field of military surgery with its many conditions unfavorable to the wounded, I cite Dr. C. R. Reyer, who, as far back as 1878, reports among the casualities of the Russo-Turkish War a list of 28 cases of wounded knee, in which the bullet was driven into the parts. The mortality of these were 16.6 per cent. In 18 of them neither primary nor secondary amputation was performed, and 15 recovered, not only without loss of limb, but with motion in the joint. Bergmann also got remarkable results. He had 15 cases of gunshot wound of the knee joint after the storming of Telisch and Gorni-Dubnik. Of these fourteen recovered,—two after amputation,—and one died. Compare this with the consensus of opinion that prevailed among surgeons of repute, in the early part of the century and even down to a later date, as regards penetrating wounds of the knee joint. Guthrie and Larrey in the French wars, Esmarch and Stroymeyer in the Schleswig-Holstein campaign, and the surgeons in the Crimea, all found that the attempt to save the limb so injured led to the sacrifice of the patient's life.

Naturally, the foregoing brief comparison of statistics engenders a feeling of pride, and while there have been, and may still be some who would begrudge the military surgeon the official rank and prerogatives, to which the nature and value of his services would more than give him a claim, he can nevertheless go forth in response to the tocsin of war for the great and important work that the future promises for him, conscious of the fact that in the march and progress of his calling he is well abreast of the age, and that as a factor in contributing to the grandeur and glory of his country's deeds he is the peer of any.

* Medical News, April 19, 1890. p. 416.

THE MILITARY VALUE OF THE DONKEY.

By Lieutenant L. D. GREENE, 7th U. S. Infantry.

THE humble donkey, or burro, seems to bear and expiate a curse that is never satiated. The butt of ribald jest, the standard of uncomplimentary comparison, the victim of contumely and harsh abuse before and since the day that Balaam was miraculously rebuked for his cruelty through the mouth of his long-eared and long-suffering beast, meek and lowly, his virtues seem ever destined to be lost in a neglected obscurity.

May it not be, however, that the despised burro is worthy of better treatment and regard? Speaking for myself, I can say that observation in the mountains of Colorado of the capabilities of the humble subject of this argument, leaves me to regard him as very much underrated. Wherever the daring prospector penetrates among the seemingly impassable rocks and cañons; where mines are opened far from beaten roads, and only accessible by paths and trails that try a man's full abilities to carry himself; up and down are seen tirelessly plodding the tuneful burros, packing sacks of ore down to the nearest wagon or railroad, and returning laden with all the necessities of operating a mine,—provisions, tools, powder, candles, lumber and sheets of corrugated iron,—that roof him in from away in front of his nose to far behind his rump; heavy and crooked pieces of machinery; all are somehow fastened to him, and somehow he steers his way up rocky and slippery trails with a certainty of foot like a goat, and more sense than some men.

Patient for hours, in storm perhaps, he waits for his load, which, received, he virtuously and steadily transports to its destination, apparently dismayed or surprised by nothing. Blasts may be set off and rattle rock about his ears; trees fall and barely miss him, or any convulsion of nature take place with no sign from him except the mild curiosity evinced when his long ears wave gently forward in disinterested wonder.

Knowing no other existence than one of hardship and abuse, he gleans a living from the brush and grass of the mountain, with an occasional empty tin-can as a relish. He is absurdly cheap;

ordinary dogs have as great a market value ; six to twelve dollars will be sufficient consideration frequently for a change of owners, and his ornate saw-buck pack-saddle is worth from three to five—if good. The price of a first-class pack mule with *aparájo* will pay for about sixteen of these little beasts, and these will carry seven or eight times the weight of freight that the mule will, and no one of them be as wild or stampede as easily as the latter; and to one who has seen his rations, clothes and cooking outfit impartially strewed over a square mile of country—more or less —by a frisky, bucking pack-mule, the latter characteristic has a value.

Then, the mule may die or run off, and the loss is considerable, not only in money value, but in loss of service ; while if the burro quits this life the loss is proportionately small.

To sum up, then, the burro is docile, able, intelligent and cheap, and this combination has suggested to my mind his availability in a field not yet satisfactorily filled in the military service. The question of the supply of ammunition to the firing line has of late commanded the attention of many writers, but their suggestions do not seem to have entirely solved the problem, and I therefore add one more suggestion to the list.

With the new quick firing arms and the consequent consumption of large quantities of ammunition, this question of supply of the firing line has gained a great importance. The impossibility of an infantry soldier carrying enough cartridges with him to last out a whole day's fight, is too apparent for discussion. Plans for renewing and keeping up the supply have comprehended the use of men, horses, mules and even dogs ; and packs, wagons, and carts of all kinds. In the character of country in which our army will probably always serve—rough and more or less wooded—I deem anything with wheels as wholly impracticable for general reliance. Men can be put to better use than in carrying freight, especially when the number needed for supplying a company of a hundred men is considered. Pack animals have not thus far been accepted as entirely satisfactory; horses or mules are all right if they do the work, but they will get stalled in the mud, hung up in fallen timber or brush, and scared and stampeded in a fight. Now, why not the burro?

The burro seldom stampedes at anything; he will stagger along under a load of half his own weight ; he can climb over, through or under timber or brush that would stop almost any

horse or mule, and if he gets stuck there or in the mud, his small bulk and weight permit his release by two or three men; and finally, if some hostile bullet finds in him its billet, the pecuniary loss to the service is very small and is easily replaced. Aside from his value under fire is his everyday usefulness on campaign.

I would advocate attaching three ordinary burros to every full company of infantry, requiring some two men to care for them in camp and to herd or lead them on the march; to feed them when there was any feed to be had, or help them to forage—as they would frequently have to for any food they obtained. On the march each burro would carry from twenty to twenty-five pounds of reserve ammunition, enough in the aggregate to materially help the company withstand an attack until communication could be opened up with the ammunition train. Among the three could be divided the company officer's baggage and mess outfit, amounting to say 25 or 30 lbs each.

A good donkey can jog along all day in total unconcern under 70 or 75 lbs. of load; we therefore have an unemployed available carrying power of from 20 to 25 lbs. which I would employ to help out another military difficulty that is always with us, viz., the matter of intrenching tools. I do not suggest placing all the intrenching abilities in this outfit;—every man should carry always with him a good strong trowel, in his belt, or, as one inventor proposes, set into and forming part of his gun-stock. Give the present heavy expensive Ordnance "hunting knife" and scabbard to the Board of Foreign Missions, for the heathen; it is neither knife, intrenching tool nor anything else useful. Relieve the soldier of its weight and give him a trowel,—not a trowel bayonet, or a combination trowel and undershirt, two in one,—but just a plain, strong, cheap, twenty-five cent trowel with which the possessor can lie flat on his belly and burrow. Under fire that is just what he needs, but how often has it occurred that the immediate availability of a few picks and shovels or spades, always in the quartermaster's trains and perhaps miles away, might have enabled an inferior force to use a few minutes before actual fire contact in intrenching so well as to change a retreat into a successful resistance? I would therefore advocate placing a few axes, pickaxes, and spades,—light but strong and serviceable,—on the three company burros, where they would be always available.

In coming into action off would come the loads,—the tools for use, officers' baggage to look out for itself, the extra ammuni-

tion for distribution,—and the donkeys, cleared for action, would make a bee line for the ammunition train, and return with a load each of cartridges through and over country probably impracticable for wheels, which was the case in a great majority of battles in the War of the Rebellion. When not bringing up ammunition or returning light, our burros could be of greatest assistance to wounded men in getting them to the nearest field hospital, on their backs or by means of pole litters or possibly travois.

In camp or in winter cantonments the burros would be of greatest utility for packing wood and water, in policing, carrying away refuse, and assisting and relieving the men in many ways.

With troops in garrison in time of peace, it would probably be advisable to keep only a few burros at a post for pack drill purposes, while the supply for the service would be concentrated at large depots and breeding stations, with many square miles of the public lands for grazing purposes and where the cost of support would be almost nothing.

To supply companies in service with the outfit proposed would be cheap to absurdity, its maintenance in service would be very inexpensive, and the writer is confident that this plan would secure a service with reference to an immediate and continuous supply of ammunition to the firing line and tools for intrenching on emergency, the results of which in any one encounter would probably much more than pay the small expense incurred; and which seems to him to be more practicable than any scheme for the purposes involved of which he has yet heard.

INTRENCHED CAMPS.*

By Lieutenant A. M. D'ARMIT, U. S. Engineer Corps.

THE inertia of conservatism is nowhere more forcibly illustrated than in the history of the development of the intrenched camp. The modern intrenched camp has literally forced itself upon military engineers, who have obstinately shut their eyes alike to its advantages and to the glaring deficiencies of the older systems of permanent fortification. Before attempting to discuss the features of this latest phase of the art of defense, a somewhat extended review of the progress which has evolved it will not prove uninstructive, and, indeed, will be seen to be necessary for a full comprehension of the comparative merits and demerits of the intrenched camp and the old bastioned enceinte, as neither alone possesses all the merits or all the demerits; for all fortification is inherently defective, and no engineer has yet arisen who can say that this or that system is perfect and secures all the guaranties of a successful defense. The best he can do is to prove one system better than another, and to this end, to the purpose of bringing to your notice the salient and well-defined advantages of the intrenched camp, I address myself.

The history of the art of fortification divides itself into two distinct parts, that of the art as practiced before the invention of artillery and that of the modern art. Between the two a great gulf is fixed. As the musket marked the downfall of chivalry and introduced a social revolution, so did its brother of a larger growth signalize a complete upheaval in the art of defending cities and usher in a new feature in civic life. Unfortunately, however, the growth of the art of defense did not keep pace with that of the art of attack, and it was truly said that a city besieged was a city captured, unless succored from outside.

Before the invention of gunpowder cities were small, and in many cases located solely or largely with a view to their defense,

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which was secured by a high masonry wall closely surrounding them, and affording the maximum resistance then attainable. But with the social development that came with the revival of learning, came the ever increasing demands of commerce, manufactures, agriculture, and all the kindred pursuits of awakened human kind. The narrow walls of an aerie city could no longer contain the struggling masses; the vast plains below, the rich valleys with their swift flowing streams, the splendid harbors with their facilities for the attainment of wealth—these must be occupied and utilized. Thus was natural protection sacrificed in the pursuit of wealth, and man's morals developing scarcely so fast as his intellect, the ravaging and sacking of cities was easy, and the spoil thus to be secured offered a great temptation.

To meet this condition, artificial fortification must be again resorted to, and here the first error of conservatism crept in. The influence of the sure protection afforded by the old masonry wall remained, and the attempt to adapt that wall to the new and totally different conditions was perhaps natural but not therefore less pernicious in its results. The evil was mitigated and even made to assume a benign aspect by the labors of one man, Vauban, the great French engineer, who during a long life, until his death in 1707, toiled incessantly to establish the equilibrium between the attack and defense.

In the art of fortification, Vauban is known as the author of three traces, of which the most prominent, his first, is the well-known bastioned front, as improved by him and applied to the fortification of scores of places in France. It was the same old masonry wall of the Dark Ages, but that wall changed and modified until it seemed almost to fulfill its mission. Thus did the genius of one man redeem an intrinsically faulty idea; and, while clinging to old traditions and fearing to branch out into those new regions where only was true success to be found, modify and improve that one idea, until, by the accumulating weight of the splendid superstructure built on so false a foundation, his eyes were opened to foresee its doom, and he was led before his death to advocate the germ of the true principle that underlies modern fortification.

For Vauban is the father of the intrenched camp, and to him the credit of its origin belongs. Blinded by the prejudices of his age, unable to foresee the tremendous future development of artillery, and fettered by the trammels of the experiences of a

lifetime in certain lines of thought, he yet in his latter days, with rare prescience, foresaw the day when all his elaborately constructed fortresses would be of no avail and his labors worse than wasted. His second and third traces show his reluctant but firm intention to free himself from the inherent defects of the bastioned front, and his ideal work at New Brisac shows us what his subsequent line of development would have been, and shows clearly, too, that had he lived fifty years longer, the intrenched camp as a fundamental idea in fortification would have been accepted one hundred and twenty-five years ago.

With the death of Vauban, in 1707, we reach the end of the period of progress in the art of fortification. Between Vauban's works and those of preceding ages there is a certain logical connection. The foundation principle is the same, and under new conditions, combatting new and greater forces, Vauban carried that principle to its maximum development. Realizing this fact, he was just turning in a new direction when his career closed and his mantle fell upon weaker shoulders.

A long period of stagnation followed; of stagnation of the worst kind, although the period of over a century shows a galaxy of great and brilliant names. But the very superlativeness of Vauban's genius and authority hung like a cloud over the minds of his successors, and no idea not strictly in the orthodox line of progress could receive a moment's tolerance. It was the period of French dominancy in matters military, and French engineers were dominated by the authority of Cormontaigne, the successor of Vauban.

This engineer, perceiving that his predecessor had reached the greatest possible strength attainable under the old system, closed his eyes to the germs of new ideas in Vauban's later work, and, abandoning the latter's second and third traces, which were the quintessence of a lifetime's experience, he devoted his undeniably great ability to the perfection of the details of Vauban's earliest trace.* In a word, he accepted as fundamental the principle that the main defense of a place was dependent solely on the strength of its fortifications, ignoring the constantly growing importance of the human element. To raise an inert mass of earth and masonry that should present in itself the maximum amount of resistance was his great ambition, and, from his point of view, his success was most marked.

* Brialmont, "Études sur la Défense des Etats," p. 27.

To show more forcibly to what extremes he carried his mistaken theory, two statements may be noted in his published works: First, the weakest point of the defense of a place should be proportioned to the value of the position; and, second, the best trace for defense is the triangle.* The first of these principles disregards the possibility of strategical combinations enormously enhancing the temporary value of a position, and hence the vital necessity for making its resisting power a maximum. This condition can never be obtained with a defense dependent for its strength upon costly embankments constructed only by vast expenditures of money and time in the intervals of peace. The second principle even more decisively rejects the value of the defensive army as a factor by actually refusing it room for protection and operation.

In short, the triangle with its prominent salients, its maximum line of development for a minimum of inclosed space, and its exposure to enfilade fire, presents a plan diametrically opposed to the true theory of defense. As a necessary corollary of this trace, the citadels are the first to be attacked, the line of defense is strongest on the outside, and once an entrance is made, the enemy finds a constantly diminishing resistance to be overcome, whereas the reverse should obtain; that is, as the enemy is weakened—as he necessarily must be by his efforts to reduce a place—so should the strength of the resistance opposed to him be increased until an equilibrium is established, his further progress checked, and theoretically the place rendered impregnable. How the theory of the intrenched camp seeks to establish these conditions will be shown later.

Cormontaigne's system of fortification was adopted at the school of Mézières, founded in 1748, and continued to be the orthodox system for more than a century. One of his successors, Noizet, carried his refinements to still greater extremes without once relinquishing the old, continuous, bastioned enceinte as the basis for all fortification. Apropos of his book published in 1859, Brialmont pertinently remarks that it might have been published in 1740 by Foucroy without any one discovering anything apocryphal therein.† Progress in fortification had absolutely ceased, and this, too, in the face of constant improvement in artillery and all that goes to constitute the strength of an attacking force.

* Cormontaigne, "Mémorial," Vol 1., p. 265.

† Brialmont, "Études sur la Défense des États," Vol. 1, p. 43.

Feebly opposing the general force of conservatism were some attempts upon new lines outside of France, notably at Modlin, Cracow, Posen, Coblentz, Plymouth, and Chatham, but the effect of these examples was slight. In 1848 there were 715 fortresses in Europe, of which France possessed 199, Austria and Germany coming next with only 52 each,* so that necessarily the French set the pattern for the whole world. The growing distrust of the existing system, and the first signs of the coming revolution are shown by the radical improvements of certain engineers, chief among whom may be mentioned Chasseloup, with his fronts 600 meters long; d'Arcon, with exterior works; Haxo, with his perfected casemates; and Choumara, with his principle of the independence of parapets. But underlying all these was the everlasting bastioned trace, from the fetters of which no one possessed the originality necessary to escape, except Montalembert, himself a line officer, who boldly came forth with his system of perpendicular fortification.†

Starting with the fundamental principle that "the surest means of prolonging the defense of a place is to destroy the batteries designed to effect breaches, and the most solid walls are those against which no battery can be erected and maintained," Montalembert did not hesitate to condemn *in toto* the bastioned enceinte and to throw to the winds the refinements of demilunes, counterguards, ravelins, covered ways, etc., so laboriously and elaborately developed by his contemporaries of the Corps du Génie. For the bastioned front he proposed to substitute long tenailled faces with salients of 90°, which somewhat defective trace he later abandoned for a simple polygonal enceinte with no reëntrants.‡

But his most radical departure was his adoption of a new idea, the idea of making the defense living and no longer relying on the inert resistance of earthen walls. To this end he provides for a preponderance of artillery fire at every point. Anticipating the realization of Viollet-le-Duc's remark that "the old system of permanent fortification is struck with impotence in the face of modern artillery,"§ he endeavors to recover the lost ground by a great force of artillery carefully sheltered in casemated structures. Thus his theory marks the transition step from

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* *Ibid*, p. 5.

† Fortification perpendiculaire.

‡ Plan for Cherbourg.

§ Viollet-le-Duc. "Mémoire sur la Défense de Paris," p. 211.

the dead enceinte of Cormontaigne with its perfection of detail, to the open works of the modern intrenched camp serving as aids to the defensive army which itself constitutes the living wall.

Montalembert made his defense alive indeed, but alive only with artillery. He neglected his communications, he retained an enceinte, he ignored the distant attack, and his whole system is full of errors in the light of modern developments. But from the point of view of his age he was a fanatic, a radical, a heretic, and a tremendous furore was raised against him. Nevertheless, he was a pioneer, and his ideas bore fruit abundantly. His polygonal trace is to-day accepted as the best; casemate fire, which he so strongly advocated, is of importance; and the preponderance of artillery fire that he aimed to secure is one of the fundamental principles governing the construction of a detached fort. He erred chiefly in clinging to an enceinte, although he ameliorated its trace; in disregarding the possibility of the horizontal development of fire; in not foreseeing the great range which artillery would attain, and so neglecting to protect his casemates against the direct fire of distant batteries; and, above all, in his failure to furnish adequate communications, so requisite for an active defense.

Montalembert's attack upon the classic system of French fortification was an apple of discord for all engineers for nearly one hundred years. No one was willing to accept the proposed system in its entirety, nor could any deny the strength of certain of his positions. As a result modification after modification was suggested, each staunchly supported by a few devoted followers, and, while the school of Mézières, afterwards transferred to Metz, continued sternly to frown upon all heresy against the traditional authority of Vauban and Cormontaigne, various definite plans were projected radically different from accepted theories but showing no unity of thought among themselves, no prevalence of any foundation principle which could prove that engineers had arrived at a definitive solution of the problem of defense. All was chaos, each new idea securing more or less attention only through the accidental prestige attaching to its author.

The great subject of discussion was the fortification of Paris. Granting that Paris should be fortified and leaving out of the discussion for the present the progress of the art outside of France, we will glance for a moment at the various plans proposed in

order to show the unsettled opinions of the authorities upon this single type problem.

Considered in the order of development toward the modern idea, we find first the single enceinte, bastioned in trace, advocated by Valazé,* Haxo, Richmont,† and Laage.‡ The first two authorities proposed a cramped enceinte inclosing the main city; the others an enlarged enceinte extending to the suburbs, with plenty of room inside. Chambray proposed an enceinte to resist a siege, with three or four great citadels established near, although the functions of the latter are not made very clear.§ A system of two enceintes was proposed by Vauban ‖ and Choumara. An interior enceinte with an exterior line of redoubts with long batteries serving as curtains was suggested by Paixhans.¶ The same plan without the batteries was advocated by Rogniat,** the Commission of 1818, and Prévost de Vernois. Marmont proposed a chain of forts with no central redoubt, while Belair†† advised two chains of permanent works, the intervals in the exterior line to be closed by intrenchments. Each of these general plans was modified in its details to suit the peculiar ideas of its originator.

The plan finally adopted and carried to completion in 1848, at a cost of $10,000,000, was a revetted enceinte, 30 feet high and nearly 23 miles in length. Its scarp was not continuous, some eighty gaps, 50 to 60 yards in length, being left in the wall. No casemates for artillery or shelter were provided, and the barracks were located back in the heart of the city. The trace was bastioned and based on a length of 250 metres, although many of the ninety-four fronts were much longer. The detached forts, fifteen in number, are also bastioned and were placed at distances from the enceinte varying from 1400 to 3800 metres, the greatest distance between any two being 2600 metres. The most important was calculated for a garrison of 4500 men, the whole system requiring 40,000 to 50,000 men.‡‡

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* Valazé. "Fortifications de Paris."
† Richmont. "Paris fortifié."
‡ Spectateur Militaire.
§ Chambray. "De la transformation de Paris ville en place forte."
‖ Vauban. "De l'importance dont Paris est à la France."
¶ Paixhans. "Force et faiblesse militaire de la France."
** Rogniat. "Considérations sur l'art de la guerre."
†† Belair. "De la défense de Paris et de tout l'Empire."
‡‡ Brialmont. "Études sur la Défense des États," Vol. III, p. 247.

Such was the culmination of a century and a half of progress in the art of fortification under the leadership of the school of Metz, which progress, viewed in the light of the advance in the methods of attack during the same period, is nothing more than an actual retrogression. Notwithstanding that between the artillery of to-day and that of the time of the first Napoleon a greater difference exists than between the latter and the hand engines of the Dark Ages, the great French nation was content to trust the safety of the greatest city in the world to a system of fortification proven hundreds of times to be inadequate for the protection of small and unimportant places exposed to the relatively feeble attacks of the artillery of the seventeenth century. The inevitable result followed. In 1870 came the Franco-German War and the capture of Paris with scarcely an effort on the part of the Prussians.

It may be argued that between 1840 and 1870 great progress had been made in artillery, and that the German strength in 1870 was far superior to any combination possible in 1840; and again that the adopted plan of the fortifications of Paris embodies the principle of the intrenched camp. The first proposition is undoubtedly true, but it must be remembered that the type to which these fortifications belong is that of an age whose artillery compared to that of 1840 was even weaker than that of 1840 compared to that of 1870. Furthermore the similarity to an intrenched camp is purely accidental; the detached forts were outworks only, adjuncts to the enceinte which was intended to afford the main resistance. These forts thus situated were supposed with the enceinte to give to a garrison superior facilities for resisting a siege; the idea of using them as auxiliaries of an active army was not even entertained.

The downfall of Paris carried with it the overthrow of French dominancy in the art of fortification, and brings us to the close of our review of the progress of that art up to the time when the older system was seen to be hopelessly in error, and when, under German supremacy in military thought, the germs of the intrenched camp, as projected by various writers, were gathered together, digested, and put into practice. The result we find today in the immense fortified strategical pivots scattered over Europe, replacing the hundreds and even thousands of minor forts that formerly dotted the map.

The intrenched camp is the outgrowth of modern institutions

of which the principal are the enormous power of artillery, the facilities for transportation, the vast armies employed, and the necessity for considering the question of expense. This last may perhaps be deemed of slight moment when the safety of a great nation is in question, but a little reflection and examination of history will demonstrate its importance. Perhaps were military engineers unhampered by considerations of cost, an invulnerable, albeit inert defense, might be provided; but where such an one has been projected a lack of funds has always led to its abandonment, its modification, or its being left uncompleted, in any case the attempt to obtain the planned protection having failed. Still more frequently must this condition obtain as the forces to be opposed increase in power, as has been the case until the burden of defense has proved greater than even the wealthiest nations could bear.

During the close of the last and beginning of the present century Europe was a carnival of war, and no country was safe from invasion. To oppose the advance of hostile armies a system of forts in two or three lines was adopted, the forts being arranged in quincunx with about a day's march between the lines and between the separate forts of each line. Vauban is ordinarily given as the authority sanctioning this system of defense, but his later writings disprove the charge. In 1701 he expressed himself as opposed to them since they impaired the mobility of the army, and above all demanded more good governors of forts, whose abilities must each equal that of a general, than could be furnished. Before his death he proposed to abandon twenty-five forts situated mostly in the north of France, and himself projected an intrenched camp at Dunkirk.* It has been already stated that Vauban was the father of the intrenched camp, and that the very basis of such work is strength increasing inward. Now, it is a principle that seems almost self-evident although long ignored, that the defense of a country is but an expansion of the defense of a place. Hence it follows that Vauban with his mind turned toward the intrenched camp as the true defense of a place, must also have seen the weakness of the triple cordon of forts on the frontier of a country, and his writings prove such to have been the case.

Nevertheless, just as his third trace was abandoned, so was his project for national defense disregarded, and he was carried down

* "Ouvrages de Vauban."

through the history of French fortifications as the genius of the bastioned front and the multitude of forts that were supposed to protect France. Claiming to be his disciple, Noizet, in 1859, with all the authority of the school of Metz, taught as follows: "The more open a country is the more should fortified places be multiplied on the frontiers; all cities of any importance should be fortified in order to deprive the enemy of the resources of the country, and to intercept the principal routes," and not to be outdone, he advocates as many as four or five lines of defense.

That this, however, was not the view of those whose business was more the attack of fortresses than their construction, may easily be proved by a few quotations from generals whose words carry authority. Frederick the Great says: "In defensive war he who covers everything covers nothing." Napoleon says: "Would you pretend to defend a frontier by a cordon? You are feeble everywhere, for everything that is human is limited. Artillery, money, good officers, good generals, all these are not infinite, and if you are obliged to separate everywhere, you are strong nowhere." Moreover, each of these forts, independently of its cost for parapets and armament, demanded a garrison which could not be reduced below a certain figure. Thus the increase in the number of forts not only increased the standing investment in war material, but in time of war entailed an additional burden for the maintenance of their garrisons without in any sense increasing the effective strength of the mobile troops.

It must not hastily be inferred from these facts and opinions that fortifications themselves were at fault, as did many of the statesmen of Europe after the Napoleonic wars had shown their futility. It was the system that was in error—fortifications themselves, rightly disposed, must always be of immense value if weight is to be given to another set of quotations from equally able authorities. Thus, Napoleon says: "If fortresses can neither secure a victory nor arrest the progress of a conquering enemy, they can at least retard it and thus give to the defense the means of gaining time, a most important advantage in all warfare." The Archduke Charles of Austria remarks that, "a defensive warfare cannot be systematically and successfully carried on in a country which is not provided with fortresses that have been planned and distributed according to strategical requirements"; and although Hamley, summarizing the results of

Napoleon's campaigns, notes that, "France had too many fortresses," he also finished by asserting that Germany, the defensive party, "had too few."

The enormous financial burden of a multitude of forts together with their practical inutility being thus clearly demonstrated, while the weight of authority and reason seemed to render the great necessity for fortifications equally clear, it remains to investigate the methods resorted to in order to minimize the expense while increasing the resisting power. Evidently these two conditions required a radical departure from the old system, that system having reached its maximum development and, during the Napoleonic wars, fallen into decadence.

In the solution of the problem the three remaining factors in the development of modern fortification already mentioned have been the most potent. Absolutely speaking, far more money has been expended upon fortresses in the past quarter of a century than in the preceding couple of centuries, France and Germany alone having spent more than one and one-half billions of francs for fortifications, and an even greater sum for their armament.*

But relatively speaking, considered in the light of an expenditure for a certain definite amount of insurance obtained against the damages of war, the great sums disbursed are small. Modern war, waged between mighty nations, with armies compared to which the classic force of Xerxes is not far superior in numbers and is vastly inferior in point of power, is an affair of stupendous moment, and corresponding expenses must be entailed in the preparation therefor. Naturally, the burden of cost bore most heavily upon the smaller nations, and so we find Belgium the first to break away from the old system, by taking the decisive step of abandoning its exterior fortresses and concentrating all its strength on Antwerp, where an intrenched camp of the first order was constructed with a front of 13 kilometres.

In Belgium, as in all Europe outside of France, a growing hostility had prevailed against the existing system of fortification which took shape in the adoption of many of Montalembert's ideas, and finally in the formation, about 1815, of what is known as the German school of fortification. Unfortunately for the purposes of comparison, the works of this school have never been subjected to attack and probably never will be, as since their construction the advance of military science has required

* Brialmont. "Fortification du Temps Présent," Vol. I., p. 5.

their protection by an exterior line of detached forts. While this is theoretically to be regretted, it is of little importance to the engineer of to-day, who is confronted by conditions essentially different from those which governed when these works were built. The advancing power of armies and artillery has rendered the German school as impotent before it as was the French school, and precisely as it would render useless any system of works based on the same fundamental principles. The French prophet of 1628,* who, anent forts, writes: "The strongest do not hold out six weeks; the best cannot take care of themselves without an army close at hand," agrees with the French reviewer of the disasters of 1870 and 1871, who says: "To surround at a short distance rich, populous, and industrious cities with works of defense is to doom them to destruction in the presence of an enemy without scruple. It is no longer by enceinte, citadel, and crown of forts that it is proper to defend cities."†

The size of modern armies has done the most toward causing the overthrow of the old system and the acceptance of the human element as the greatest recognized factor in war; I say recognized, because careful study of the sieges of all times will show that, in the last analysis, the human element and tactical considerations have always *actually* been of vastly more importance than the vagaries of the divers traces. To quote from Frederick the Great, "Tout dépend de la tête plus ou moins forte de celui qui y commande," while a modern writer, General Clarke, of the British army, summing up the evidence given by the various sieges of the time of Napoleon, concludes that "Within broad limits the nature of the fortification mattered exceedingly little; general tactical considerations decided the result."‡ Facility of movement was introduced by Frederick the Great, and given still greater impetus by the genius of Napoleon, who always made the issue of a contest depend upon a decisive battle, announcing his belief that "fortified places are the prizes of victory; armistices cause their capitulation."

Under these circumstances sieges grew less and less important as elements in the game of war. From the tenth to the eighteenth century there were more sieges than battles, from 1741 to 1763 the ratio was as 69 to 100, during the French Revolution as 26 to

* Pagan.

† Viollet-le-Duc. "Mémoire sur la Défense de Paris," p. 211.

‡ Clarke. "Fortification," p. 21.

100, while during the Empire it fell as low as 16 to 100.* These facts prove that a modern defense must provide for a battle between opposing artillery and infantry forces of great power, and that army will be successful which possesses the greatest tactical advantages, the advantages of the shelter of works, and the opportunity to adopt at will defensive or offensive operations. In short, the works must aid and protect the troops, not the troops man and protect the works. Troops first, works auxiliary; not the reverse point of view. Just as an army in the open field will derive the greatest advantage from field intrenchments, so will a nation preparing for war find the greatest benefit to be derived from a well-chosen system of permanent fortifications, intelligently designed, not to afford in themselves any protection whatever, but simply to afford to an active army the greatest facilities for operation and entail upon the enemy the most stupendous efforts for their capture; efforts of great magnitude, not because of the intrinsic strength of the works to be carried, but because of the impregnable wall of human flesh to which they afford such protection as will prevent its destruction.

This idea the earlier writers never grasped. While it is true that Vauban originated the plan of the intrenched camp, it was the geometrical plan only—the living idea never occurred to him. With him the intrenched camp was but a means of increasing the strength of the enceinte, which was always the point to be considered. Fortifications first, men to support them—such was his idea. His memoir, dated 1696, shows that he designed his camps to be mere temporary constructions sheltering from 10,000 to 12,000 men, their principal objects being to force the enemy not to disregard them at the peril of the security of his communications, and to prolong the main defense when the enemy was compelled to lay siege. Lloyd and afterward Guibert proposed making Vauban's lines permanent, but, generally speaking, engineers held strictly to Vauban's ideas as is shown by the writings of d'Arcon, Montalembert, Noizet de Saint Paul and others; all of whom persisted in regarding the intrenched camp as but an accessory to the defensive works of a place.

Gen. Rogniat was the first to expand this primitive conception into something approaching the modern idea.† In 1816 he advocated a system consisting of four closed forts on hills forming

* Lenchy. "Fortification," p. 484.

† Rogniat. "Considerations sur l'art de la guerre."

a square about three miles on a side. These forts were to be supplied with large calibre guns and to be supplemented by temporary works in the intervals, thus forming an intrenched camp with space for 100,000 men. Such intrenched camps he proposed to locate about 50 miles apart on the frontiers and toward the capital, which was not to be fortified. In so far as this scheme necessarily thrust the burden of defense upon the army itself it meets the requirements of to-day. It has serious defects however, which will appear in the subsequent discussion. Rogniat's plans met with little approval, the conservative element fearing to risk its armies away from the protection of scarp and parapet.

So far we have dealt entirely with the art of war in Europe, and necessarily so, because until this time Europe was the theatre of civilized war and her engineers alone were competent to pass judgment upon questions of scientific warfare. But from this time on, a close examination will prove Americans to be in the front ranks of progress as far as theories are concerned, although unfortunately the evidence of constructive works is against them. The first system of American fortification, dating from 1789, the second from 1809, and the third, as constructed after 1816, followed closely the lines of European practice, the last system being in fact to a great extent planned by a French engineer in the service of the United States The peculiarities of republican institutions and geographical position did for the United States what could not be expected to obtain in Europe. Necessarily the first care was the protection of the sea-coast, and these fortifications were planned with consummate skill according to the views of the times, so that about 1850 it was said that the United States possessed the most perfect system of sea-coast defense in the world.* At this period land attacks by forces landed from transports were to be guarded against, and to this end the forts were built to sustain sieges of from ten to fifty days and so render a comparison with European works possible.

Commenting on the system in 1851 an American writer says: "The expensive arrangements of these land defenses have greatly increased the cost of the works, already from their very nature very costly, and at this day excite the surprise of the professional examiner, acquainted with the vast means of collateral defense possessed by the United States, that anything more

* Maj. W. H. Chase, 1851.

should have been required for most of the works than security against assault by escalade."* Again, commenting on masonry fronts in 1862 a Congressional committee frankly admits that "our nation in all its increased strength is measurably as defenseless as in 1816."† So much for adverse criticism on the existing works.

Passing to the question of land defense pure and simple, we find the geography of the country plainly imposing its restrictions, while republicanism asserts its opposition to expensive works and extensive standing armies. Thus Secretary Poinsett in 1840, advocating a certain minor system of fortifications, says: "It cannot be too earnestly urged that a much smaller number of troops will be required to defend a fortified frontier than to cover one that is entirely unprotected; and such a system will enable us, according to the spirit of our institutions, to employ the militia effectually for the defense of the country." An interior ship-canal from Maine to Louisiana, constructed chiefly for defense, was advocated as early as 1822 and again in 1862. The necessity for facility of communications between the ocean and the lakes, both by way of the Hudson and Mississippi rivers, was repeatedly urged, and it was maintained that such facilities being secured fortifications along the northern frontier would be unnecessary. So strongly were adequate communications felt to be essential to defense that in 1840 Gen. Edmund P. Gaines in a memorial to Congress proposes a great scheme for defense, whose main feature is a vast system of radiating railroads centring about Louisville, Ky., thus by many years antedating the modern strategical railroads of Europe.

In 1826, Bernard and Totten assert that "the army and militia, together with the marine, constitute the vital principle of the system." Although acting together as the Board of Engineers and being responsible for the masonry forts above condemned, it does not seem that they could fully have realized the modern significance of their statement. We find Gen. Totten, however, frequently reiterating the statement, and are led to believe that he deemed it peculiarly applicable to the land defenses of the country. Thus, in 1840, he writes:

"Should it ever become necessary to sustain by force our title to the territory now in dispute [the northeast boundary] it must

* Maj. W. H. Chase, 1851.

† Report No. 86, H. R., Thirty-seventh Congress, p. 4.

be done, not by isolated forts along the frontier, commanding, probably, nothing beyond the range of their own guns, but by an active army, competent not only to occupy the country and hold it, but also to assume the offensive if necessary and carry the war beyond our borders. But while it is not deemed expedient to construct a chain of forts along this portion of the frontier, the Board considers it a proper measure of precaution that positions should be selected and preparatory arrangements made for the establishment of depots of supplies at the head of navigation on the Kennebunk and Penobscot. In the event of movements in that quarter these would be proper points for the concentration of troops and would serve as a base of operations, whether these should be offensive or defensive in their character."

And again in the same report:

"In reference to the northern frontier generally, it is the decided opinion of the Board that, besides the defenses which have been suggested along the border, chiefly for the purpose of local protection, there should be a great central station at some position in the interior at which troops might be assembled for instruction and where they would still be within supporting distance of the more exposed parts of the frontier. Turning our views inland in search of some single position at which preparations might be made for extended operations on the frontier, and from which aid and succor could always be speedily derived, some position which, while it shall be equally near to many important points of the enemy's possessions, shall afford at no time any indication of the direction in which our efforts are to be made; which will, if possible, unite the opposite qualities of being at the same time remote and proximate, far as to distance but near as to time; which, while it brings a portion of the military resources of the country to the support of the inland frontier and places them in the best attitude for operations in that quarter, whether defensive or offensive, at the same time takes them not away from the sea-coast. Looking for these various properties, we find them all united in a remarkable degree in the position of Albany.

"From this place, by steamboat, canal boat, or railroad car, troops and munitions can be transported in a short time to Buffalo, or onward to Detroit, to Oswego, to Sacketts Harbor, to Plattsburg, to Boston, and along the coast of New England; to New York by steamboat now, and soon by railroad also; and

thence onward to Philadelphia, Baltimore, Washington, and the heart of the Southern country, if necessary. In a word, Albany is a great central position, from which radiate the principal lines of communication to the North, to the South, to the East, and to the West, and combines so many advantages for a military depot that the expediency of occupying it and thus availing ourselves of those advantages would seem to be manifest."

I have made the above quotation thus lengthy for two reasons —first, because it contains the true essence of the idea of an intrenched, permanent camp, which in all its details I propose to show was worked out by another American officer eighteen years later, and, secondly, because it shows that Totten was very similar to Vauban in his professional fate. He spent the brilliant efforts of a lifetime in perfecting a system of masonry fortification whose downfall he prophesied and which he almost lived to see; and he suggested and urged the true modern system as shown above, without living to see it adopted, through the necessity of changed conditions.

In 1836 Secretary Cass said: "It seems altogether inexpedient to construct expensive fortifications, which do little more than protect the space under cover of their guns, which are not required as places of depot, which guard no avenue of communication, and which would leave the surrounding country penetrable in all directions." Again: "It may perhaps be deemed expedient to establish a depot for the reception of munitions of war in some part of the peninsula of Michigan and to strengthen it by such defenses as will enable it to resist any *coup de main* which may be attempted."

When we consider the quotations already given and their dates, the book of Noizet in 1859 presenting the best, or, at least, the dominant type of, European fortification, and the present status of fortification, the assertion that the United States led the world in theoretical progress prior to 1870 must be indisputable.

In Europe as well as America, however, mere theories had no weight and the orthodox system held its own. To the many projects brought forward various objections were raised: an intrenched camp embraced a vast extent, could not be guarded, gave the enemy the choice of too many points of attack, did not permit sorties since all the troops must be continually on the *qui vive* to secure immunity from surprise; all of them objections based upon the principles of defense that governed in an enciente

and void of basis in the light of the true principle that the troops are *not* to guard the works, but that it is the function of the works to help guard the troops.

If a fortress is to be of any service at all it must afford employment for its entire garrison, and with the armies of to-day such a fortress on the continuous enceinte principle would be enormous in cost, without counting the well-known disastrous effect of cooping up vast bodies of troops with a populace perhaps more or less disaffected. Sorties in mass would also be impossible, for they must be made through gates; and gateways, guarded never so well, must after all be but defiles, involving all the hazards and inconveniences attending their passage everywhere. Add to these considerations the power of artillery and its deadly, destructive effects, together with the growing humanitarian tendency which forbids the subjection of a noncombatant populace to the horrors of an old-time siege, and the imperative necessity for breaking the enceinte and finding some better form of protection is apparent.

Early attempts in the right direction were not lacking. Thus, in 1830, the Archduke Maximilian constructed at Linz an intrenched camp consisting of thirty-two casemated towers situated 500 metres apart. There was no central redoubt and little provision was made for infantry. The towers are now falling into ruins. Posen, begun about the same time, was on the true principle and has lately been completed.

At this time the zealous advocates of the intrenched camp pointed triumphantly to the examples of Buntzelwitz and Torres Vedras in support of their theory, forgetting, what their opponents did not, the essential consideration that these were instances of intrenched camps properly so called—that is, they were temporary structures designed to serve only as an aid to the armies in the field. However successful, and their success is incontestable, they should not be used as an argument for a system of permanent fortification based on an analogous principle. One point may be cited in confirmation of this: Frederick the Great himself says in reference to Buntzelwitz and his other similar camps: "An intrenched camp is like a garment; it must be neither too large nor too small." While opposed to this is the present principle that an intrenched camp cannot be too large—within reasonable limits, be it understood. The lines of Torres Vedras approximated more nearly to the conditions of to-day, for

here the Duke of Wellington had but 90,000 troops distributed in a line of more or less isolated works extending for 10 leagues. The example of Antwerp has already been noted, and the engineer of its works, Gen. Brialmont, staunchly advocated the principle of the intrenched camp in his work "Études sur la Défense des États," published in 1863.

Without depreciating in any way the value and originality of Gen. Brialmont's work, it is but justice to a talented but unfortunate American engineer, who was killed at Petersburg in 1864, to here assert his claims to priority in publication of all that constitutes the gist of the above-named work. In 1858 Gen. J. St. Clair Morton, then a lieutenant of the U. S. Corps of Engineers, in a letter to the Secretary of War on the dangers and defenses of New York City, advances and maintains by sound argument nearly all the views of Gen. Brialmont published five years later. In the early part of the same year, in a memoir entitled "Notes on Fortification," Lieut. Morton broaches a plan of defense composed of a system of detached bastioned forts with low earthwork curtains and improvised or permanent batteries in rear of the curtains. These curtains were from 550 to 750 yards long, about 12 feet high, and separated from the bastions by a ditch. The bastions contained redoubts, but had no outworks except a covered way. He thus claimed to combine the advantages of detached forts with those of a continuous enceinte while also securing plenty of interior space.

On the whole, however, the above plan seems to be an attempt to get away from the defects of the bastioned work without relinquishing the trace entirely. It was but a tentative scheme, and eight months later, when solving the problem of the defense of a given locality, the genius of Morton led him to develop the true idea. He asserts his proposed plan to have been rendered possible only by the improvement of the small arm, but he does not himself attach sufficient importance to the keen recognition he displays of the value of the army, and especially of citizen soldiery. A close analysis of his writings will show that it was to provide for the utilization of this element of strength, so essentially American, that his whole system is devised. Premising the landing of from 80,000 to 100,000 troops on Long Island for the attack of Brooklyn and New York, he shows the utter impossibility of combating them with success in the open field by means of semi-disciplined masses of militia, however large. He,

however, shows clearly how such troops, given a proper shelter, may prove themselves equal or even superior to regular forces.

He then proceeds to discuss the qualities of defensive lines as follows:

"The two most essential requisites in lines have always been, as they are at present, the presenting to the advance of the enemy difficult material obstacles, which shall be rendered as near impassable as possible by the fire of its defenders (this involves, evidently, the disposing of the troops in such a manner that their musketry shall reach every portion of the space directly in front of the lines). And secondly, that the troops must not be so scattered along the intrenchments, in order to fulfill strictly the first condition, as to render any point of the line weak and powerless to resist a violent attack by a large column which should attempt to surprise or storm the works.

"These two conditions are now, and have hitherto been universally recognized, but have been, *owing to the limited range of the musket*, difficult to combine in the same line. * * *

"But this inherent difficulty, which in former times has thus hampered all sorts of schemes for the defense of extended positions, has been dissipated by the invention of the Minie rifle, which, by expanding the range at which infantry fire is effective in an immense degree, gives the engineer the fullest latitude of conception, and renders easy, both of design and execution, plans which may combine in themselves every desirable defensive property, and which are adapted as well for undisciplined troops as for regular soldiers. * * *

"Detached works are better adapted than continuous intrenchments to the strengthening of a tolerably extensive position, particularly if regular troops are to be had for its defense, for in this case the works may be regarded merely as auxiliaries and as sheltering, to a certain extent, manœuvres effected in their rear; or they may defend particular important points and so advantageously take the place of large bodies of troops which might be better employed elsewhere."

Here follows a discussion of detached works for the defense of extended lines, showing that up to 1854 their use was properly condemned.

"As there is no material obstacle between the works to retard the columns of attack, this conclusion amounts to placing the aid derived from the fortifications, when they are of this sort, in a

subordinate estimation compared to the active defense which is expected from the troops in the field. * * * Here the reader will please to recollect the abstract of the argument in hand and note that the above reflections, which are suggested by and refer to only those lines that have been constructed (in actual warfare) before the Eastern war, do not apply in such a degree to similar works that may hereafter be thrown up because of the improvements which have within a few years been made in the habitual fire-arm of the infantry soldier—an element in warfare which forms the very foundation of all plans of fortifications, whether temporary or permanent."

Here follows a further discussion of the value of detached works with a true comprehension of their defects, *considered purely as inert obstacles to an enemy's advance.*

* * * "In fine, such a system may be made to combine every desirable requisite as constituting a highly defensive artificial military position, with the sole exception of not presenting a continuous material obstacle to the enemy. If, therefore, we combine a continuous line with a system of large detached works at 1200 or 1400 yards intervals, we will have as perfect a system of fortification as is possible or can be desired."

It being thus shown that continuous and broken lines present advantages and defects wholly irreconcilable, Lieutenant Morton proceeds to demonstrate how, under improved conditions, the defense of a line may be sustained by detached works which shall by their small-arm fire effectually guard the intervals and render their passage even more hazardous than when opposed simply by a continuous line of intrenchments, manned by a thin line of troops, and will, moreover, leave a large reserve force for active operations in the open. Proceeding then to discuss the best arrangement of the detached works, he enunciates the following principles:

"*Fourth.* Of the proper location and nature of inclosed works in line.

"The inclosed works of a modern system of lines should be:

"1. Located as far apart as possible, to conform to the other essential conditions; because the fewer they are the more pains can be taken with each one to strengthen it, and also the more troops can be stationed in each, out of the total number that can be spared for the garrisons.

"Hence each work could be stronger in itself to resist a sepa-

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rate assault, and also would give a more formidable flanking fire upon the approaches to and ditches of the intervening intrenchment.

"2. The works should not, however, be so distant as to prevent their sweeping, by their musketry as well as their artillery fire, all the ground between them, including the immediate vicinity of the curtains which joined them, and the enfilading of the ditches of the latter.

"As I propose to confide the flanking of the entire system to the inclosed works specified, and as the necessity of a thorough flanking *both* of the approaches and ditches of all intrenchments is a universally admitted military principle, no more need be said on this point. * * *

"*Sixth.* The size of the inclosed works.

"They should be large enough to deliver a very heavy flanking fire on the approaches, etc., of the intrenchments.

"This fire should be of both artillery and musketry; in fact, all the artillery disposable for the defense of the lines except the flying batteries should find room in the redoubts.

"*Seventh.* In deciding upon the shape and size of the inclosed works of a line, we must, besides the action of *each upon the ground around it*, consider the necessity of providing for its separate and independent defense against attempts at escalade, or even a short siege.

"It is because of the peculiar property of a redoubt of satisfying the above condition separately from the other that I have chosen it in preference to the star fort or bastion fort, which have generally been constructed to defend the more important points of lines. * * *

"*Ninth.* The intrenchments connecting the lines should be defended by a line of skirmishers only, to accord with the general theory of the system. They should not, therefore, be revetted lines, but earthworks, thrown up on the anticipation of a descent on the island, and strengthened by abattis and *trous-de-loup* on the slopes in front.

"*Tenth.* An easy and rapid communication from one wing to the other is an essential requisite of a good system of lines.

"*Eleventh.* Transmission of intelligence and orders.

"There is in a fixed position, which is occupied long beforehand in expectation of an attack, every facility for making perfect arrangements for conveying instantly information to the headquar-

ters and to the posts interested of every movement of the enemy; and the rapidity and certainty which a proper organization will impart to combined movements of different divisions are so valuable that no pains should be spared to insure them."

The length of line thus proposed to fortify was 14 miles, extending across the western end of Long Island. The difference between Lieutenant Morton and General Brialmont seems to be that whereas the former shows the greatest respect for the work of his predecessors and simply claims for his scheme an originality made possible by changed conditions, the latter adopts the more logical view and claims that the true *principles* of defense have always been the same, and, claiming this, he does not hesitate with consummate skill to point out the errors of the elaborate "systems" of former military engineers and show that their works in their very inception were foredoomed to impotency. Lieutenant Morton's plan, although approved by the Secretary of War, found no general acceptance, and in America met a fate similar to that of General Brialmont's work in Europe.

On both sides of the ocean example and precept availed little, and when 1870 brought the German forces against Paris, its fortifications were still in an incomplete condition, in addition to their being based upon faulty principles and a scale incommensurate with the object to be defended and the forces to be opposed. Since 1870, however, the advance has been rapid, and the true aim of fortification is beginning to be understood as well as the nature of the conditions of modern warfare. Preceding the active constructive work of to-day was a short period of discussion concerning the true principle of national defense and the rôle to be played therein by fortresses.

First and foremost was the vital question as to whether it were not better to abandon permanent works altogether. It was admitted that the multitude of forts formerly deemed necessary was not only unavailing, but positively pernicious in the face of modern conditions. Great armies must be met and combated by equally large armies, or armies rendered equally strong by artificial aid. Could not this aid be as easily secured, and far more cheaply, by means of field-works constructed by the troops themselves? Sebastopol, Torres Vedras, Vicksburg, Richmond, Atlanta, Paris, Kars, and Plevna were cited as examples either of the value of hasty works or the inutility of permanent ones. A brief consideration of each of these cases will show why

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the general consensus of opinion pronounced so decisively in favor of fortifications, and supported that decision so staunchly by appropriating the enormous sums already expended and to be expended for permanent works.

Concerning Sebastopol, the obstinate resistance afforded was due almost solely to the defenses constructed by the arduous labors of from 5000 to 10,000 laborers constantly guarded from attack by the troops. Had the works been already constructed, those laborers would have been available as fighting forces, and the enormous losses sustained by them would have been requited by corresponding losses inflicted upon the allies. The opinion of the gallant commander of the defense must not be without weight, and he clearly asserts that had Sebastopol been fortified it would never have fallen—an opinion concurred in by his opponents and military critics generally.

The case of Torres Vedras has been already cited, and was a clear triumph for fortification, albeit fortification on a new plan. Its eminent success and the semi-permanent character of the works is only another argument in favor of the intrenched camp. Vicksburg was defended by a few simple works strengthened after its occupation by the troops. Simple as were the defenses, they enabled the army to endure two bombardments, repulse three assaults, and resist regular siege operations extending over forty-four days, and finally to capitulate only after a total resistance of two hundred and thirteen days, owing to food and munitions having been nearly exhausted. And all this in the face of the fact that the besiegers had an abundance of artillery, while the defenders scarcely used a gun. Had artillery and proper emplacements been provided beforehand, the capture of Vicksburg would have been rendered exceedingly problematical. Petersburg and Richmond by their resistance emphasize the importance of using the army as the chief defense and the value of hasty intrenchments, while their ultimate downfall points a moral concerning the vital necessity of artillery power for the defense, and the need of previously constructed works in strong positions. The somewhat similar case of Atlanta, which had been fortified and eventually had to be turned instead of captured, still further strengthens this view. The siege of Paris teaches several important lessons. Inadequate as its defenses were and miserably manned by a few thousand irregular troops, the significant fact is that the city held out for four and a half months, thereby more

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than fulfilling the purpose of its fortifications and affording ample time for the raising of an army of relief. That such an army was not raised, and that Paris was not properly garrisoned and supported, have nothing to do with the case. They show clearly the distressing military condition of France at that time, but they weaken the importance of the works of Paris not at all.

As has been already stated, it was the intention to complete the works after the war began.* Although several months elapsed and every endeavor was put forth, they were not finished; and this fact furnishes a striking refutal of the proposition that an intrenched camp guarding a great centre may be a temporary structure. The artillery of the defense was almost valueless, that in the low-lying and hastily constructed batteries being of far more use than the guns placed in the permanent works.† Thus were the two essential features of an intrenched camp—artillery and infantry strength—at a minimum, and yet, despite all that, the Prussians were fain to resort to a blockade and the reducing power of starvation rather than risk a quicker mode of capture. A blockade was possible only by taking up a line of investment 80 kilometres in length, and the occupation of even this vast perimetre was secured simply because the outlying forts were too near the enceinte, and were commanded by the strong positions occupied by the Prussians. Thus was one more lesson taught—the necessity of extending the outer cordon until investment shall be made humanly impossible.

Kars is clearly an anomaly, but it is certain that, whatever else may be demonstrated by its capture by assault in 1877, the strength of its works was not to be blamed. Brialmont accuses the commandment of being a traitor or else incapacitated to govern,‡ while Clarke significantly remarks that "you cannot make an indifferent and badly handled force safe with all your money and art."

There remains to be considered only the case of Plevna, and here the opponents of permanent works can find no argument; for, while Plevna was doubtless a provisional work, it nevertheless assumed the dimensions of a permanent one before it was required to display the qualities of the latter. When first occupied,

* Viollet-le-Duc. "Mémoir sur la Défense de Paris," p. 13.

† Clarke's Fortification, p. 68.

‡ Brialmont. "Fortification du Temps Présent," p. 49.

Osman Pasha's troops had practically nothing to fear from the enemy, who were far too weak to make a respectable attack. Owing to the delay in bringing up Russian reënforcements, the Turks had four and one-half month in which to shelter themselves behind a line of works 36 kilometres in length, and during the first three months had free communication to the rear. Had Plevna been a permanent work equipped with artillery, or had Osman Pasha been a different general, the position would never have been invested and captured. Theoretically, Plevna fulfilled its purpose; its fall only emphasizes a point concerning intrenched camps that will be alluded to later.

The deductions thus drawn from actual sieges in support of a system of permanent works may be supplemented by the opinions of eminent authorities. Napoleon has already been quoted as well as the Archduke Charles, and Wellington similarly expresses himself. The critics Jomini and Hamley are of one mind in the matter. Brialmont concludes that "a defensive army has greater liberty of action and a larger field of operations when the objective is fortified." Prince Charles, in his "Principles of Strategy," says: "There ought to be in every state a place of arms which should be the key to its position, assuring its independence, and without the capture of which the enemy could make but precarious invasions and create evils easily repaired." General Sherman writes, "Earthworks, especially field-works, will hereafter play an important part in wars."

It is believed that the foregoing discussion proves the necessity of permanent works, of intrusting the main defense to an active army, and of devising a new method of fortification which shall be in accordance with modern conditions. It remains, therefore, to consider the location of the points of defense, their character, and whether or not they will, when properly used, result in establishing the superiority of the defense to the offense.

The quotations already cited indicate a general tendency favoring the fortifying of the objective. Now in general the objective is the political capital, and the disastrous results of a failure to adequately fortify that point are shown by the fate of Paris in 1814 and 1871, of Vienna in 1805, 1809, and again in 1866, and of Richmond in 1864-65; notwithstanding which Paris and Antwerp are the only two capitals fortified, although Bucharest is being rapidly converted into a defensive position of the first order. In the last two cases the smallness of the countries renders the capi-

tals so easily accessible as to prohibit the adoption of any other plan. In the case of Paris we find something peculiar in the relation which Paris sustains to France. Paris is France, and with Paris in danger all France is paralyzed. Moreover, the position of Paris is such, in relation to the exposed eastern frontier, that it must stand the brunt of an early attack in case of a semi-successful invasion, and by its resistance will afford protection to by far the greater portion of France, which it covers. Hence the decision of the French to render Paris invulnerable seems wise. Germany, on the other hand, can well afford to neglect Berlin, for when Berlin is threatened, well-nigh all of Germany must have been conquered, and a defense of the last ditch is no longer to be contemplated. The fortifications and impassable morasses to the east, and the intrenched camp at Magdeburg on the west, will secure the capital of Germany against all assaults.

In America, owing to the geographical and political conditions of the United States, it was not deemed essential to fortify the capital, and the energies of engineers were chiefly directed to the problem of protecting the great centres of wealth and industry. When, however, the Civil War introduced new conditions and divided the country into two adjoining belligerent powers, the situation was analogous to that which obtains in Europe, and accordingly the political capital having become of great strategical importance, Washington was surrounded by a line of works which, at first temporary, assumed before the end of the war the dimensions, profiles, and arrangements suited to an intrenched camp of the first order.

Brialmont, in his "Études sur la Défense des États," points out the necessity for establishing great fortified depots at strategical points between the capital, itself fortified, and the frontier. Thus the defensive army is afforded an opportunity of crushing an invader before his attack of the capital. If, however, the defensive army is beaten, the enemy is at least materially weakened for his attack on the capital, while the defenders, falling back upon the reserves, are strengthened. In a later work, "Fortification du Temps Présent" (1885), he again advocates fortifying the capital and the keys of the great lines of international communications. Recognizing the great mobility of modern armies, he favors simply the establishment of a great pivot of operations upon routes of invasion necessarily traversed, and cites the strategic triangle in the north of France. The defense of minor routes is intrusted to *forts d'arret*.

XUM

In accordance with these principles, great intrenched camps have been built all over Europe, taking the place of the previously existing small forts which have been modified, enlarged, or, as in many cases, abandoned or razed to the ground. The principal fortresses are in France—Paris, Toul, Epinal, Langres, Besançon, Rheims, Lille, Lyons, and Verdun; in Germany—Metz, Strasburg, Cologne, Mayence, Ingolstadt, Thorn, Marienburg, and Magdeburg; in Austria—Olmutz and Trent; in Russia—Kiev and Brest-Litowskii; in Belgium—Antwerp; in Roumania—Bucharest.

There thus seems to be a practical unanimity of opinion regarding the solution of the problem so far as it is governed by strategic considerations. As might be expected, a far greater diversity of views is met when we examine the details devised to meet the requirements of the defense of the position chosen. Throughout this essay we have tacitly regarded the principle of the intrenched camp as the true one, and its universal acceptance makes any argument in support of this view unnecessary. This principle demands the removal of the possible line of investment to such a distance as shall secure the defended city immunity from bombardment. Considering the range of modern artillery, this distance alone would render the idea of a continuous line of fortification impracticable, and hence we are led at once to the adoption of detached forts for the outer line of defense.

A brief *résumé* of the reasons for abandoning the bastioned trace in favor of the polygonal for these forts will, by expansion, show the reason for the adopted arrangement of detached forts. The salient advantages may be thus epitomized: great development of besiegers, security from enfilade and reverse fire, increased interior space, absence of crowding of defenders in sharp angles, and facilities for more perfect communications. All these advantages are of increased importance when it is a question of sheltering one great army from the attack of another, and have compelled the adoption of a form for the outer line as nearly circular as the configuration of the ground will permit. Above all are salients to be avoided, as a salient can always be enveloped and reduced without receiving its proper support from adjacent works.

So far there is a general accordance of views. Concerning the radius of this outer cordon, more diversity of opinion is seen. Of course the power of artillery must be an important factor in rendering a decision. Thus Brialmont, in 1863, holds to 4000 metres

as the distance between forts and enceinte, basing his calculation upon a range of 8000 metres, which he considers exceptional and against which he proposes to secure only the more important part of the city; he regards with consternation the contemplated political necessity for removing the forts 7000 metres from the enceinte, and yet in a manuscript article translated by Gen. Barnard* several years later, this is the very distance he adopts as necessary. The early German works were constructed with 4000 to 5000 metres as the regular distance, although at present the Germans as well as the Austrians hold to a mean of 6000 metres. The same distance, 6000 to 7000 metres, is given by Plessix and Legrand in their "Manuel de la Fortification" (1883), although the French generally hold to a mean distance of about 5000 metres. Some of the distances adopted in actual construction are as follows: Strasburg, mean, 3540 metres; Cologne, mean, 3600 metres; Verdun, from 4000 to 5200 metres; Toul, 4000 to 6500 metres; while at all these places, as well as at Lyons, Dijon, Rheims, Belfort, and elsewhere, exceptional instances of forts situated 8000 and even 9000 metres from the enceinte are not rare.

These distances seem to have been determined almost wholly from a greater or lesser apprehension of the destructive effects of long range artillery fire. A careful comparative study of the sieges of recent times and those of the seventeenth and eighteenth centuries, will render it doubtful whether modern artillery really does more damage to a city than did the smooth-bore artillery of former days. Vandalism, and the reduction of a place by terrorizing the populace seem to have died out of warfare, and the present tendency is to fight and reduce only that which actively resists. In view of this moral phase of modern warfare it seems scarcely necessary to lay such great stress on the dangers of bombardment.

A far greater importance should be attached to increasing the radius of the outer line with a view to increasing the length of the ine of investment and thereby preventing blockade. By blockade were Paris, Metz, Vicksburg, and Plevna reduced, and the lesson thus taught to Paris has not been allowed to go unheeded. The new works just completed at enormous cost will render Paris forever proof against a repetition of the disasters of 1870–71. An army of investment based on the rules adopted by the Prussians must now occupy a line 160 kilometres long, and be

* Johnson's Encyclopedia.

composed of from seventeen to eighteen corps d'armée; in other words, must consist of nearly the total present fighting strength of Germany.*

The difficulty of garrisoning such an extended line need not militate against its adoption for several reasons. First of all, the fact must not be forgotten that we have abandoned all idea of making fortified places intrinsically strong; the question is rather that of aiding the army. With an active army in the field, the hostile forces cannot be diverted to capture fortified positions; they must follow the defensive army and endeavor to crush it, so that we may accept as an axiom the principle that no great strategical point well established in a good position will ever be besieged unless the active army takes part in its defense.

This being true, that army must be afforded every facility for operation. It is not to be considered as occupying a position; it has rather chosen its own theatre of operations wherein are plenty of positions to be defended; alone or in conjunction with the artillery of the enceinte and forts the defenders can always manœuvre on advantageous interior lines without exposure to defeat in detail, nor can the enemy surprise and carry a portion of the outer line and thereby overthrow it all, as was the case in the defense of the continuous lines of former times. On the contrary, the enemy, in order to invest the place, must spread his cantonments over a long line, exposing himself to attack in detail by the concentrated masses of the defense, which, by virtue of their position, should always possess the advantages of mobility, initiative, and a secure line of retreat.

The permanent garrison of such a work may be small even though the works be considerably extended. Moreover it may be composed of reserve national guards and raw recruits. Napoleon recognized the value of thus utilizing this element when he said: "50,000 men defending a capital will resist the entrance of 300,000 or 400,000, while these same 50,000 men, in the open, being raw and not commanded by experienced officers, will be routed by 3000 cavalry." Therefore it seems that up to the limit when its garrison must draw from the material strength of the active army, an intrenched camp cannot have too great a line of development.

The distances between forts must be governed largely by the accidents of the terrain. Brialmont's original proposition that they should not be too far apart to secure cross fire in the inter-

* Ténot. "Paris et sa Fortification," p. 166.

vals with small arms and the concerted fire of artillery of collateral works upon the enemy's works of approach, still retains its value, although the distance he advocated, 2000 metres, may now safely be increased to 4000.* Certain French authorities give 6000 metres as the maximum in an open country, although sanctioning 14,000 metres in peculiar situations, as at Paris, where the devious course of the Seine permits such a distance without entailing any undue exposure.†

The construction of an enceinte has been a point much debated with engineers, strong arguments being advanced both in favor of it and against it. Brialmont, in 1863, accepts its construction as axiomatic, although one of his strongest reasons, the control through the gorge of the detached forts by the artillery of the enceinte, is to-day rendered nugatory by the great distance separating them. In 1885 he still staunchly supports the same opinion, basing it, however, on somewhat different grounds. Plessix and Legrand advise an enceinte to place a city secure from surprise and to furnish an interior line of defense, making it large enough to permit the city to grow, embracing the principal suburbs, being simple in trace, and arranged chiefly for infantry.‡ The projects of Gen. von Sauer, Gen. Schott and Mougin leave an enceinte out of consideration. Gen. Clark, in his somewhat remarkable book, strongly inveighs against an enceinte, but nevertheless, he seems to prove its utility when he quotes the general reluctance of the Germans to attack fortified places. Moreover, he says: "Had Paris and Metz possessed two months' more food supply the fortunes of war might have been changed," and yet it is generally conceded that had there been no enceintes Metz must have capitulated after Gravelotte, and Paris after the capture of Chatillon.

Whatever may be the arguments against enceintes the fact remains that all completed works possess them, and while this may be due to their previous existence and necessary incorporation into the works of defense, there are no new works of great magnitude being planned without them. Considering the fact that the chief function of an enceinte is to guard against surprise or assault after the decisive defeat of the defensive army, and that it may be comparatively cheaply constructed while its possession of

* Brialmont. "Études sur la Défense des États," vol. 1, p. 101.
† Plessix and Legrand. "Manuel de la Fortification," p. 347.
‡ Plessix and Legrand. "Manuel de la Fortification," p. 343.

certain virtues is incontestable, it seems sound doctrine to follow the generally accepted plan. By utilizing to the full the value of entanglements and the intensity of fire securable by means of magazine and machine guns, an enceinte in every way secure from surprise or assault may be constructed at such a slight expense as to make a neglect to provide such a valuable accessory of a complete defense seemingly most unwise.

Having discussed the general character and position of the outworks, the necessity for an enceinte and the general rule to be followed in its construction, it remains to consider the details of the detached forts and their armament together with the disposition of the space between them and the enceinte. In arriving at definite views upon these points material aid will be derived from a glance at the methods of attack to which an intrenched camp may be exposed.

The evidence of history points to investment and starvation as the most successful means, but this method we have already opposed by such an extent of the line of investment as will render anything approaching a perfect blockade impossible. Nevertheless, despite all difficulties, this will undoubtedly be the method attempted in future wars; but under the present tendency toward enlarged perimetres and with a defensive army at all commensurate to the value of the position, the chances of its success must be considered as reduced to a minimum. Bombardment is by the same means practically prohibited. There remain, then, assault and regular siege. Evidently regular siege operations can only be carried on after the defeat of the active army, and the capture of nearly all the detached forts; and after the attainment of such successes on the part of the enemy the position may well capitulate, for the resources of the country must be exhausted in order that such a condition may obtain, which fact precludes the necessity for constructing an enceinte strong enough to resist a siege. Assault may be possible under any one of three conditions: first, when the defensive army shall have been overwhelmingly defeated in the field and, being in utter rout and closely pursued, finds itself unable to take protection under the shelter of the forts; second, by a surprise, the assaulting columns passing under favorable circumstances between the intervals in the forts; and third, after the capture of one or more of the detached forts. Doubtless these conditions may all be difficult to realize and may involve extreme hazard to the enemy, and against an active and

watchful army may be impossible, but nevertheless there is a possibility of their obtaining, and as a guard against their success a *sturmfrei* enceinte seems a necessity. With such an enceinte the chances are so greatly against success that the enemy will scarcely hazard the attempt. Hence we find the actual fighting line to be the cordon of detached forts, and the study must be to secure it against all possible methods of attack.

Evidently investment is out of the question. So also is regular siege against the belt of forts as a whole, and also against a few of those forts with a view to forcing an entrance. To attain the latter end the enemy must be sufficiently strong to maintain the investment of the whole line so effectually as to demand considerable masses of defenders at all points to prevent assault, while controlling a reserve force large enough to conduct siege operations over a space larger than was ever demanded by any work carried by this mode of attack; these siege operations to be prosecuted while exposed to the sorties of the active army which it must be remembered is always to be considered as operating within the outer line of forts, ready to concentrate its action at any point, and by the facility of its communications able to do so far more quickly than can the enemy moving over an outer circumference.

Bombardment alone must necessarily be a difficult operation if the forts and batteries are properly disposed, although as a means of preparing the way for an assault it must be considered as really dangerous. As a defense against bombardment alone, several precautions must be taken. The importance of indirect artillery fire has been too much disregarded, the accepted idea being that a wall that could not be seen could not be breached, whereas nothing is easier for the modern howitzer. Not only must long-range rifles and howitzers be considered, but mortars also, the recent development of accurate vertical fire making it a most important element, and especially dangerous because no defense is possible against it, or at least no defense which would be capable of making any effective offensive return.

To guard against these evils detached forts should be as shallow as possible, have low and securely screened scarps, and have their artillery arranged so that it may be withdrawn from danger during the distant attack and brought out in full strength against a near attack or assault. In short, the correlation of the forts and their profiles and traces should be such as to render

them proof against the distant attack, and assailable only by batteries placed at short range, and then the establishment of such batteries should be contested by troops and artillery.

The fanciful schemes brought forward by iron founders from time to time and involving the use of turrets, etc., seem to require little consideration. They demand a sacrifice of mobility, afford the best of targets, have no interior space, and while possibly possessing advantages in peculiar situations, or as auxiliaries, they certainly cannot be relied upon to constitute the outer line alone.

Another factor of safety against bombardment pure and simple is the time necessarily consumed and the expense entailed, particularly as it must be but a preliminary operation at the best, to be followed, if success is to be obtained, by others, even longer and more arduous. Assault, either alone or preceded by bombardment, must be the method to be generally relied upon. Preceding it by bombardment is only to expose the intention and permit preparation for its repulse. The essential element of assault is surprise, and against that every precaution must be taken.

To secure the ends already indicated as necessary the general plan has been to erect detached forts with short flanks, in the form of a lunette, and with an abundance of artillery fire. The artillery has in many cases been supplemented by iron turrets in the centre of the work. In general, however, the plan recognized as most nearly correct has been to establish the chief artillery defense in the works exterior to the redoubts and flanking them. By this means the possibility of preparing the way for assault by bombardment is utterly denied. The enemy's artillery must first silence the defensive artillery, and in this attempt does no damage to the infantry parapets.

The defeat of the batteries of the defense should be contested by all means known to the skillful artillerist. The struggle must be an artillery duel wherein the advantage should inure to the defender. That it may do so, however, the great advantage the enemy possesses in his mobility must not be ignored, and perfect communications, with adequate facilities for concentrating artillery fire upon any desired point, must be regarded as an imperative necessity.

Against assault by surprise the magazine rifle and improved machine guns should be most potent defenders. A few sentinels thus equipped should be able to hold in check an assaulting

column until help arrives. Against the regular assault the same weapons must be the chief reliance. In olden times, when an active enemy could pass the exposed space while two or possibly three shots were being fired, the wide space and serious embarrassment afforded by the ditch was a necessity. To-day, in front of the magazine gun, the assaulting force is met by a literal hail of lead, by an intensity of fire against which no columns or lines can stand. Add to the potency of these weapons, sheltered behind a parapet, the delay caused by some well arranged entanglements, or, if the circumstances favor, that of a ditch, and it would seem as though an assault must surely fail.

The idea of constructing an inner redoubt in the principal forts seems to be a step backward, although it is staunchly supported by certain authorities.* A redoubt should, under the conditions already exposed, be of value only as a last resort after a siege, and this we have seen to be a contingency little to be feared. Moreover, logically, they must be constructed in all the works; for in order that siege may be necessary, assault must have proved futile, and investment have been perfected, which condition renders the siege of any work as easy as that of the particular one which may have been prepared to resist it. The enemy's object is to break the line and secure access to the defensive army, and it is fair to presume that he will adopt the easiest place to make his attempt. The construction of redoubts, the adoption of armored casemates, of disappearing turrets, and all the paraphernalia of iron construction is only a step toward making an intrenched camp a fortress modelled upon the old principle of intrinsic resistance, ignoring the fact that with an army such works are unnecessary, and without an army are useless, however strong.

Whatever may be the strength of the outer line the fortunes of war will inevitably at times lead to the enemy's breaking through. Then he must be met by the army, prepared to receive him. A large field of operations is presented which the defenders must have intrenched and prepared for the most vigorous defense. The artillery of the enciente and the adjacent works will sweep the terrain more or less perfectly, and must be supplemented by field batteries and heavy guns transported by rail and located in favoring temporary emplacements. All that the enemy has done he must find necessary to do over again, and this, too, against an

* Brialmont. "Fortification du Temps Présent."

increasing strength due to concentration without cramping, and with matériel and personnel seriously weakened by the losses sustained in securing the results already attained.

In order that the terrain may be in the most favorable condition, perfect communications must have been provided, and every obstacle that could aid the enemy or embarrass the defenders removed. To this end certain laws for the maintenance of fortresses must be enforced at all times. Brialmont thus summarizes these laws:

1. Constructions of incombustible material, ditches or excavations, are forbidden for a distance of 1500 metres from the crests of the most advanced salients of the glacis of the enciente, the forts, redoubts, or batteries of a permanent character. Constructions of combustible material to be submitted to military approval.

2. No raised road or bank to be made in this zone except the position thereof be agreed to by the military authorities.

3. Forestration within 3000 metres prohibited.

4. Works of trespassers of the law to be destroyed at the owner's expense.

5. Constructions in progress must not be enlarged.

6. When these latter must be destroyed the owners shall be entitled to an indemnity.

We have now discussed the principles governing the arrangement of an intrenched camp, and have seen that the essential conditions of a perfect defense are organization, capable commanders, efficient armaments, adequate supplies, matured preparations, and well arranged communications.* Such being the case, let us see with what chance of success these forces may be opposed to those of a perfect system of attack.

Without discussion it is evident that no defense can avail against an overwhelming preponderance of power, and hence a just equilibrium must be assumed and the decision made to hinge upon whether modern conditions are such as to make an equal number of capable defenders decidedly superior to the attack, or such as to afford an inferior force reasonable chances of resistance and such an increase of strength as will make defeat impossible and ultimate victory even probable, when the enemy shall be exhausted by his futile attempts to burst the barriers opposed to him. The power of modern rifled artillery is often cited as evi-

* Clarke. "Fortification," p. 129.

dence of the hopelessness of attempting to oppose resistance by fortifications. It seems to be forgotten that artillery can only be directed against defensive works when the opposing artillery of equal power shall have been silenced. And despite the facilities of transportation of modern times, and the enormous siege trains thus made possible, it must always be easy in times of peace to accumulate at the comparatively few great positions to be defended, a preponderance of artillery over all that may be brought against it. "Efficient armament" is one of the conditions already enunciated, and with free interior communications providing for its effective manipulation there is absolutely no reason why the increase in artillery power should be disadvantageous to the defense—rather, decidedly the reverse. To apply Maurice de Sellon's sneering remark anent Montalembert's works, that their attack was "but an affair of artillery," to modern fortifications would be as malapropos to-day as it was when made, since it would ignore the fact that that was exactly what the attack was expected to be, and that it was to be resisted by an equal or greater force of precisely the same character.

Again, it is forgotten that while the cannon has increased in power the small arm has similarly increased, if not in a greater ratio, and that the small arm is essentially the weapon of the defense. In an assault the attackers can make no use of the rifle, and in passing over the shortest possible open space are exposed to an irresistible intensity of fire from magazine guns. With magazine guns alone at Plevna the Turks were able to repulse every assault of the Russians with ease. This fire is to-day still further augmented by the deadly work of machine guns with their controlled fire of hundreds of shots per minute discharged by an operator who, behind a steel shield, is absolutely safe from any sharpshooter. It is a question whether the magazine gun has not more than offset the advantage secured to the attack by the improvement of artillery, even leaving out of consideration the certain advantages derived by the defense from this very improvement.

It, therefore, seems certain that far from modern inventions having forever placed the defense at a disadvantage, they have, on the contrary, increased its innate strength until there is no reason why a well disposed intrenched camp constructed according to fundamental principles already enunciated, and deriving its main strength from the operations of an active army ably com-

manded, should ever be captured except by an enemy so overwhelmingly powerful that all successful resistance must be manifestly impossible.

It has been steadily assumed that the defensive army is maintained at its maximum efficiency, and it has been shown why this assumption has been made necessary from the fact that all history proves that no system of fortification can afford any resistance except as it supplements the resisting force of the army. To the end of increasing this aid to its maximum, engineers have devoted their utmost efforts with results herein discussed, but their very success has aroused a class of critics who, while admitting the success, fear lest the aid thus securable will impair the efficiency of the troops in the field and result in their demoralization before a powerful and aggressive enemy.

Doubtless this is a possible evil, but we cannot express our own opinion concerning it more forcibly than by quoting the opinions of several eminent European authorities. Thus Plessix and Legrand* comment as follows:

"It seems rational, then, to admit to-day that a fortress ought never to be considered as a base of operations for an army; that is to say that it is insufficient to furnish the army indefinitely with a refuge in case of defeat or a pivot for its offensive operations. That it should *temporarily* serve the army for shelter; that it should be a *point d'appui* in strategical manœuvres; that it should cover a concentration or a movement by controlling the means of communication of which an enemy must make use to harass these different movements; all this is indisputable. But in no case ought an army to shut itself up in a place or even take refuge there sufficiently long for an enemy to be able to complete the investment thereof."

A striking illustration of which is seen in the lesson before alluded to as taught by the capitulation of Plevna owing to Osman Pasha's dilatoriness in making good his retreat. Commenting on this same defeat and Bazaine's action at Metz, Brialmont† says: "To know how to utilize the passive force of these positions for the profit of the active rôle of the armies, will always be the characteristic of great generals." Again we find Plessix and Legrand‡ contending that "The bad use of a good investment

* "Manuel de la Fortification," p. 429.
† "Fortification du Temps Présent," p. 12.
‡ "Fortification du Temps Présent," p. 431.

does not impair the value of the latter, and, logically the consequences should be imputed solely to the responsible agent." Granting that in all strong fortifications there is this danger despite the merits of the army commanders, we find therein a powerful argument for building only such fortresses as will enhance to the utmost the active strength of the army, while from their very nature they palpably deny that army any hope of success when once it becomes incapacitated for its proper service and wholly or even partially reliant upon the walls of the works for its protection —a point which we have endeavored to keep in view while discussing the true principles of a modern defense.

XUM

WHICH ARE THE MORE NEEDED FOR OUR FUTURE PROTECTION, MORE WAR-SHIPS OR BETTER COAST DEFENSES?*

By Lieutenant GEORGE W. VAN DEUSEN, 1st U. S. Artillery.

BEFORE our late Civil War, the principal seaports along both the Atlantic and Pacific coasts had been or were being provided with what were then considered to be very efficient fortifications, and which were really so, considering the means of offense which could be brought against them at that date. The appropriations for their construction had been made on quite a liberal basis and the work had been conducted with great care and skill. During the Civil War, the first occasion which had arisen to put them to the test, nothing definite was evidenced to show that they were not capable of performing the work required of them. To be sure, some of them in the Southern ports were captured after bombardment by hostile fleets, but in most of these cases it can safely be said that this capture was due more to the weakness of the defenders themselves than to any essential damage inflicted by the shells of the enemy. It must be considered that they were very imperfectly provided with the important outlying defenses of submarine mines, and that the guns were poorly manned and worked; so that there was very little to prevent the attacking fleet from taking up any desired position and maintaining it as long as was deemed necessary.

After this war was over, the people at large were tired of matters warlike, and were also, many of them, impressed with the idea that after our experiences in that war we had nothing to fear from any nation, and that, if any emergency should occur, "Yankee ingenuity" would rise to the occasion as it had done before, and provide all means necessary to accomplish the desired end, not taking into consideration the fact that the enemy against which these means had just proven successful only after a bitter conflict, was no better prepared for the struggle in the beginning than ourselves, and much inferior in strength and resources. Holding such views as these, the country naturally

* Read before the Officers' Lyceum at Fort Columbus, N. Y.

devoted all its attention to repairing the losses caused by the war and failed to keep watch on the developments going on abroad, many of them the result of the lessons taught other nations by our war, which developments were rapidly causing our ships, guns and fortifications to be classed in the category of "back numbers."

It required some striking illustration to wake the people from this lethargy, and this awakening first occurred in the direction of the navy. On several occasions the possibility of trouble for us abroad brought into startling contrast our antiquated wooden tubs and the modern war-vessels of other nations, even of some of our much laughed at South American neighbors. Consequently the popular cry arose for a new navy. The pressure brought to bear on Congress was too strong to be resisted and the work was commenced as soon as possible.

As the navy was the first to attract the public attention, it has, up to the present time, and justly too, received the lion's share of the funds. And it can hardly be disputed that, in many ways, they have made better use of their money and produced a better showing, proportionally to the amounts expended, than have the military authorities. But this revival in the direction of the navy also called attention to the helpless condition of the other defenses of the country and resulted in the formation of the Endicott Board in 1886, which, composed of representatives from the army, navy and civil life, formulated an elaborate scheme for coast defenses, for which certain moneys were appropriated, and on which work is being done in a more or less desultory way in accordance with the funds available.

At the present time this question naturally arises. Given,—only a limited amount of money, not enough to accomplish properly both purposes,—which should be considered the more important, to increase our fleet of sea-going war-vessels or to secure our important seaports against foreign attack? The distinction "sea-going" vessels is made for the reason that certain coast-defense vessels and torpedo boats should be and are classed as part of the coast defenses proper and should be separated from the navy in a consideration of its strength.

There can be no doubt that the old navy of a few years since was a disgrace to our nation and the laughing stock of others, and it was eminently fitting that all efforts should be bent to overcoming this state of affairs. But have we not reached a point where a halt may consistently be called in the construction of

further vessels, provided the money is more needed elsewhere? We have now a fleet of modern light cruisers that will do credit to the United States anywhere, as was illustrated during the naval review in New York City, and again shown by the fleet recently collected in the harbor of Rio Janeiro.

To be sure we have no very heavy battle-ships, though some are now building, but it is a question not devoid of considerable doubt as to whether we want many of these cumbrous machines. The experiences of the past few years have not been entirely in favor of them and there are many experts who are inclining to the use of lighter ships and guns. The limit of armor that can be floated has been reached and yet guns and projectiles are constructed which will pierce this thickness of armor with little difficulty. The weight of these vessels, which would be deadly if properly directed against an enemy, is also fatal to friends as well, as was shown in the recent case of the *Camperdown* and *Victoria*. This weight also decreases the speed and increases the difficulty of manœuvring, causing accidents similar to the grounding of the *Sultan* and *Camperdown* and the tangling up of the *Black Prince*, *Basilisk*, and *Triumph* during the manœuvres in 1890, when all three had to be towed ashore in disgrace. The ease with which they can be sunk is shown in the recent case of the *Javary* in the harbor of Rio, whether she was sunk by a projectile from one of the forts, or, as claimed by some of the insurgents, because of her listing to one side and sinking from her own weight.

The chances are that we shall never have occasion to send ships of this class abroad. There is very little reason to expect that we shall ever find reason to send an invading fleet to attack any European port or nation, and our only use for war-vessels abroad is to have them on hand to look out for American subjects and interests in case of necessity. That end can be subserved by a number of ships like the *New York* and other cruisers of that class, which, in case of war, would also serve as commerce destroyers.

Hence the only use for battle-ships would be to protect our coasts. And would they be of a use for such a purpose proportionate to their great cost? Or could not the same object be better and more permanently effected by the use of coast defenses? The modern battle-ship is an immensely expensive construction, and requires a constant expenditure to keep it in

working order, and even then, its life is very uncertain. Its use for even coast defense on a long stretch of coast may be illustrated by the recent case of the *Resolution;* which was unable to proceed across the Bay of Biscay in the face of a storm, but was compelled ignominiously to turn about and hobble back to England, where she has since been practically condemned as unseaworthy. And this on account of a storm that any ordinary merchant vessel would have weathered without difficulty.

And that there is yet much to be learned in the matter of naval construction may be reasoned from the facts that one or more of the recently constructed French battle-ships have been held in port because they were considered to be too top-heavy to be sent out, even on a calm day, to make their final trial trips; and also that it has been found necessary to make considerable alterations in some of our latest cruisers to insure their safety.

The United States of late years has been credited with being very conservative in the matter of expenditure of money for warlike constructions, but has been content to watch other nations spend their money in experiments, with the idea of taking advantage of the results gained and avoiding the mistakes. What we needed was a fleet of cruisers which would carry our flag to foreign ports and convey the idea that this country could possibly afford some slight protection to her interests abroad in case of necessity. Such a fleet we now have, and some of the cruisers are not to be excelled by those of any nation in the world. Would it not be well, then, to call a halt in the construction of any new types until some further experience can be obtained from the trials and tribulations of other nations? And this especially until more knowledge may be obtained of the possibilities of the new agents of naval warfare, the dynamite and submarine guns?

These dynamite guns can be mounted on comparatively light, swift and inexpensive vessels, and if it is found that by their speed and ease of manœuvring these vessels can dodge the guns of the battle-ships long enough to plant one or more of the dynamite projectiles in the proper place, then good-by to the battle-ship. For the difference in cost, time of building, and everything else, is so great that even should one or two of the light vessels be destroyed and the third succeed, it would be a victory for the dynamite.

When a naval power desires to be able to send, at any moment, a strong expedition to make war upon a neighbor, or wishes

to protect its coast-line at every point, it can only do so by means of a preponderating naval equipment. But we do not find ourselves included under either of these conditions. We are so widely separated from all nations of great importance that there is absolutely no probability that we shall ever be called upon to send against them an invading force. It is contrary to all the principles of our government to engage in foreign wars, and we have already enough vessels to assert our superiority over any of our immediate neighbors, England, of course, excepted. Our coast line is too long to be defended at every point, nor is there any reason why such a thing should be attempted. In the very remote contingency of an invading army being sent against us, it would be necessary to land them at some point where all their supplies and matériel could be landed with them, and where they could soon reach some point affording easy communication with their own country, or could find ample supplies belonging to the invaded country. Such landing places will be found at very few points along our coasts on either side of the continent, and generally occur near some of the large cities, and only such points will need to be strongly defended.

The greatest, and, probably, only danger for us is from the unprotected condition of the approaches leading to our great cities, which affords a constant temptation to any power possessing a few strong war-ships to make an attempt on some trifling excuse, to collect valuable ransom from these centres of wealth. Eliminate this danger and a long step has been taken towards the proper protection of the country. But this can only be done by the construction of coast defenses of the highest order.

That this fact has been at least partly appreciated is shown by the recommendations of the Endicott Board and the subsequent appropriations of money for the carrying out of part of these recommendations. But the appropriations are sometimes not at all adequate to the actual needs, and often real loss occurs through delays in the work caused by lack of funds. For this reason it would seem that, for a time at least, the navy should be satisfied, and wait further developments while all available money is put into the defenses. And it is for the interest of the navy itself that this should be so, as it is very essential for it to have strongly protected harbors into which its ships can retire in case of necessity, and also to have its navy-yards and other establishments well protected.

There is not such an element of uncertainty about work on land as on water. There is no question of stability, as the land can support any thickness of protecting armor, and the extreme limit of penetration of any high-power naval guns that can be used in the attack can be computed with enough accuracy for all practical purposes, so that the parapet may be made of sufficient thickness.

High explosives may possibly be counted as unknown factors in the attack of these fortifications, but it hardly seems probable that they can be used with much effect from a vessel against works on shore. The best materials and forms are decided upon, so that all that is necessary is money. And when the works are properly built and manned, there will be no need of constant dry-docking for repairs, but they will remain there for many years at comparatively small cost for maintenance.

True economy would be shown in providing all funds needed for pushing these important works to speedy completion, including the construction of all guns and carriages needed. That the importance of such protection has been realized for many years is shown by the following quotation from a report of Bernard and Totten in 1826:

"Fortifications must close all important harbors against an enemy and secure them to our commercial and military marine; they must deprive an enemy of all strong positions, where, protected by naval superiority, he might fix permanent quarters on our territory, maintain himself during the war and keep the whole frontier in perpetual alarm; they must cover the great cities from attack; they must prevent, as far as practicable, the great avenues of interior navigation from being blockaded at their entrance into the ocean; they must cover the coastwise and interior navigation by closing the harbors and inlets from the sea which intersect the lines of communications, and thereby aid the navy in protecting the navigation; and finally, they must protect the great naval establishments."

But when we now speak of coast defenses, we do not mean fortifications alone, but all the accessories connected with them, such as submarine mines, moveable torpedoes and torpedo boats, and in some cases, armored coast-defense vessels or floating batteries.

At several important points it is impracticable to place the works far enough from the place to be protected to preclude all

danger from bombardment, and in such a case the defense should take on a sort of offensive character, and the big guns on shore be assisted by big guns afloat, mounted on light, heavily armored vessels of slight draught, quickly manœuvred by twin screws in water so shallow that they are in no danger of being rammed by the heavy vessels. The waters in which the enemy could lie for purposes of bombardment must also be rendered dangerous by means of submarine mines and torpedo boats. These same means must also be used in connection with the shore batteries for closing the channel leading to the port. Were this unobstructed so that the enemy's vessels could run in at full speed, although some would probably be disabled by the fire from the batteries, others would succeed in running the gauntlet and in gaining a position inside the defenses where they would hold the city at their mercy. But, knowing the channel to be well obstructed with mines which are well secured from interference by the protection afforded by the shore defenses, and with the guns and mortars prepared to rain a shower of shot and shell upon the intruders, no nation would care to subject their costly fighting machines to such risks. And as the attack of such points would be the principal or sole objective of any nation making war on us, the knowledge that they were thoroughly protected would be more effective in warding off such a war than all the efforts of diplomacy or arbitration.

Regarding the ability of a naval attack to silence and cause the abandonment of properly constructed land works, there has been little opportunity of late for forming any opinion, but the probabilities are in the negative. The only regular battle between ships and forts for some time was the bombardment of Alexandria in 1882, and there the advantages were all on the side of the navy. The forts were mostly of antiquated construction, occasionally strengthened in places in a quasi modern manner; the guns were mostly old smooth-bores and the only good guns, the M. L. Armstrongs, were many of them poorly mounted and worse served. The magazines were, in many instances, very much exposed to the fire of the enemy; and, worst of all, no use whatever was made of submarine mines, so that the attacking fleet was at liberty to take up any desired position. There were very few trained gunners among the Egyptians, most of the work being done by a mere rabble of volunteers. Opposed to these were some of the best ships and heaviest guns of the British navy,

firing most of the time from fixed positions and at known ranges. Even under these conditions only comparatively small portions of the works were placed in such a condition that they would have been considered untenable by a trained garrison of fairly good soldiers, and had there been such a garrison the damage would have been much less as the ships could not have fired with such care and under such favorable conditions. Furthermore the ammunition supply of several of the ships was almost exhausted. So that the fact that the works were actually abandoned by the defenders after the bombardment cannot be considered as a real point in favor of the naval attack.

It is hoped that nothing that has been said may be construed to convey the idea that we now have enough of a navy, as nothing of the kind is intended. We will need more ships of war in the future, especially if our foreign commerce develops, as the chief function of the navy in time of war will be to protect our own commerce and prey upon that of the enemy. And the building of more ships will be of advantage to the artillery in another way, in that it will provide places for the now supernumerary naval graduates and officers and take away from the navy the principal cause for the cry set up by certain members to have the coast-defenses transferred from the army to the navy. But what is meant, is that the navy has now reached a point, or will have reached it when the ships now in process of construction shall be completed, at which it should be content to rest for a time on what has been done, and all the funds available for warlike constructions should be devoted to placing the important points along our coasts in a complete condition of defense. With all possible means available this will take no little time, and until it is done no navy can give us a feeling of perfect security against foreign aggression.

STAFF SERVICE IN THE STATE TROOPS.

By Colonel JAMES G. GILCHRIST, Iowa National Guard.

FOR some time the military periodicals have had much to say concerning the organization of the State troops. Some writers have presented most elaborate schemes, perfect in detail, but lacking in practicability; others have gone to the other extreme. All of them, I think, have omitted, beyond a mere allusion, any adequate attention to the staff departments, notwithstanding the fact that these are at the same time the most important and the most inefficient of any portion of our State organization. This may sound rather strong, but the fact is, I think, demonstrable.

The line of any military force is of course the combatant portion; there could be no service without it. It cannot be too efficient, and nothing should be permitted to interfere with its progress and development. Most of the States are doing all that they can, under existing laws and conditions, to keep it in touch with the march of progress. Still, is it not a fact, that with our military instruction in colleges and fondness for mere drill by the average American youth, a force fairly well instructed in the mere rudiments of drill would be an easy matter to secure on short notice? The fact also remains, however, that we need a force at hand that has gotten a little further along than these "rudiments." We must be careful to avoid anything that would in the smallest degree, cripple the combatant portion of our State forces; it must be kept in the highest possible condition of effectiveness consistent with the existing conditions. But this depends upon another branch of the service very largely—the administrative. Of what good are troops that are poorly armed and equipped, from an inefficient Quartermaster's Department? or cannot be got to the point where their services are needed? Or having secured transportation, are unfed, or have food of such quality or irregularity of issue that it amounts to the same thing—owing to inexperienced or inefficient commissaries of subsistence? It would seem that if a choice had to be made between efficient and well-trained combatants, and good staff departments

and poor line, the staff would rank first. It is indisputable that even good troops are more effective with good staff service. May not the converse be equally true, that poor troops are poorer with inefficient staff?

The defects in the staff departments of nearly all of our States are due to manner of appointment, tenure of position, and anomalous rank; which last is partly the cause for misappreciation of function or duty. Let us take these up in order:

Manner of Appointment.—Considering, for purposes of argument, the regimental staff as part of the staff organization, we find it regimental in one sense, and staff corps in another. The medical officers, chaplain, adjutant, and quartermaster, appointed by the regimental commander, are not "details" from the line or departments; they serve during his pleasure, and go out of service with him. This necessarily, with reference to the purely technical officers, at once forbids professional advancement and military efficiency. The anomalous state of things here can be easily remedied by the creation of permanent staff corps. As to the proper regimental staff, that needs remodelling as to methods of appointment, detail and relief, but this matter is not germane to our subject. It may be said, however, that the State service should be homogeneous, with reference to the whole country, and must have a standard. This is furnished in our national army, and such matters should be determined by the army practice. In fact the whole staff organization should be modelled on that of the army, modified, of course, to suit the conditions: but this requires a change in the code of most of the States. It is the purpose of this paper to suggest a practicable method.

In the outset, limit the regimental staff to the orthodox one,—adjutant and quartermaster, to serve by detail. All other staff officers serving with a regiment, to be detailed from the appropriate staff corps. The same consideration should obtain in the case of brigade staffs.

The difficulty is that there is no such thing as a staff corps, properly speaking, in many, if not all the States. The governor appoints what is called his staff, and it goes out of office with him. The individual members are appointed, not for professional attainments or military experience, but on political or personal grounds. Most of them are never called upon to do any duty, and perhaps it is just as well, as things are—being largely ornamental. This staff is a necessary thing, possibly, but objection

able from its magnitude. Think of a governor, having a force of 2500 rank and file, and a staff of aides and "special" aides, all colonels, some fifteen or twenty in number! The proper staff,—for these gaudy gentlemen can hardly be taken seriously,—is all right as to number, but the fault in the organization is a fundamental one.

For instance the Adjutant General is usually selected on account of military knowledge and proficiency, and not infrequently he will be retained through more than one administration. The anomaly in this office is that instead of being a chief of staff, he often asserts a right to command. A notable case occurred, some five or six years ago, in Ohio, where the Adjutant General established headquarters in a state camp and assumed military command. In this instance, however, some of the regimental commanders very properly entered protests, and in the military trials that followed, the result was, if my memory serves, a proper adjustment on military lines.

The duties of the Quartermaster General, in many States, are carried on by the Adjutant General; in others the office is filled, that is, some one is appointed to the office, but rarely can he be said to fill it. Even in such States as New York, Massachusetts, and Pennsylvania, where good military systems obtain, when some great emergency arises, it is the rule for the transportation system to break down. With the exception of the Adjutant General and Surgeon General, professional or technical fitness seems to be of no value, the appointees being, as often as not, men who have had no military training or service; who owe their positions solely to partisan influences, or personal relationship to the executive. However, as the appointment carries no pay, and is quite expensive as well, some of these offices are perhaps as well filled as need be, *provided* there is guarantee of no call for service.

Without going too much into detail, it would seem in the first place to be a fair arrangement to insist that, inasmuch as each staff corps or department is useful solely in proportion to its efficiency, and efficiency is ordinarily a matter of training, such positions should be filled by appointment from the line, by selection, at least in the lower grades. As it stands at present the staff officers on brigade and division staffs are appointed by the commanding officer, and are responsible directly to him, notwithstanding there are titular heads of their departments on the governor's staff.

Suppose a State force of two brigades, as in Iowa, why should not all the staff officers be detailed on the general staff? This would give all the administrative departments a chief on the governor's staff, and as many subordinates as there are brigades. The chief is not an appointee of the governor, but reaches the head of his corps by promotion as vacancies exist. The juniors are appointed from the line, as vacancies occur, by selection from among those who have shown special aptitude. Many would object that this would be anomalous in a State where commissions only run for five years. But consider—many of these positions call for particular skill and knowledge, and a *system* of administration. The work that is laid down by these political appointees is not taken up under present conditions by one who has had training in lower grades; it is lost, absolutely. The new man begins where his predecessor did. Some day comes a big strike, or some call to active service, and we find troops in plenty, but transportation in confusion, commissariat paralyzed, and all administrative function worse than useless, as it is in dire confusion. This is not a fancy picture; many of us have suffered from it.

Tenure of Position.—Next to the pernicious methods of appointment, which alone would forbid any expectation of efficiency, the short, and at times uncertain, tenure of office is fatal to the acquisition of the requisite knowledge. Staff officers on the brigade establishment go out with their chief, *i. e.*, the brigade commander, and are liable to dismissal at any time. They have no chief in their department, so if the relations become inharmonious, there is no relief short of resignation.

In the case of the governor's staff, in which are found the titular heads of the departments, the condition is even worse. The term of office is shorter, they are not expected to do any duty, and in most cases could not do it if required. They are mere figureheads, more or less ornamental, depending upon circumstances. If regular staff-corps were organized, with regular promotion, and perpetuity of tenure, or at least a tenure depending upon good behavior, the conditions would be very different. This would be a most difficult thing to bring about in most of our States, as it would draw too sharp a line between staff and line. But it would seem that careful consideration of the immense advantages to be derived would recommend it to all who desire to make the State service a veritable *service*, and the force

a truly military one. With such an arrangement, the brigade staff—excepting the aides and orderlies—would be detailed to such duty by the chief of their department or corps, and if relations with the brigade commanders should become unpleasant in any way, a change of detail would set it right, instead of mustering the officer out of service entirely as is now done.

Anomalous Rank.—If the State service should be, as far as possible, modelled on that of the United States, the rank now given staff officers must be seriously considered. The first objection to the high rank given these officials is that it cheapens military rank, and renders the whole establishment ridiculous by the multiplicity of officers, who are known to their townsmen and neighbors to be absolutely without any qualifications. The country is flooded with "generals," "colonels" and "majors," until the genuine article feels that the "post of honor" is very truly "in private station." Think of a State, like Iowa, that has one major general, six brigadier generals, six colonels, eighteen lieutenant colonels, fourteen majors, forty-nine captains, and ninety-eight lieutenants, to command 2019 men, part of this number being bandsmen! It is almost too serious to be humorous.

But this is not all. The last report of the Adjutant General of one of our Western States includes, as part of the *military force* of the State, two college battalions, none of whose members are enlisted into the service of the State, nor owe it any service; besides one "battalion" of young women, with a "major" Mary so and so, and four "captains," and eight "lieutenants," with the requisite "staff," all with names suggestive of female characteristics. Now all this is something that calls for protest from military people everywhere, as it renders the State service ridiculous and degrades it even to the level of the militia of the "corn-stalk" period.

There is another objection, however, alluded to in an earlier paragraph, that the rank of these staff officers tempts them to assume command of troops when they find themselves in military assemblages.

Now as a general summary,—taking my own State as an illustration, and the customs of military service, as I understand it, the world over,—the organization of the general staff should be as follows: assuming the enlisted strength to be two brigades, each of two regiments, and an aggregate strength of 2500 men. The governor is entitled to the honors of a general, in his own

State. His staff proper should be four aides, of the rank of captain, or to concede something to the possible necessity for display, say major.

The remainder of the staff organization is not *his*, but a permanent one, and should run as follows:

1 Adjutant General, with the rank of colonel.

2 Assistant Adjutants General, with the rank of lieutenant colonel, and major, for assignment to brigade staff.

1 Quartermaster General, as above.

2 Assistant Quartermasters General, as above.

1 Surgeon General, with rank of colonel.

2 Assistant Surgeons General, with rank of lieutenant colonel, for assignment to brigade staff.

4 Surgeons, with rank of major, and 4 Assistant Surgeons, with rank of captain, for assignment to regiments.

1 Inspector General, with rank of colonel.

2 Inspectors General, with rank of lieutenant colonel, and major, for assignment to brigade staff.

1 Commissary General of Subsistence, with rank of colonel.

2 Assistant Commissary Generals of Subsistence, as above.

1 Judge Advocate General, with rank of colonel.

1 Assistant Judge Advocate General, with rank of lieutenant colonel.

1 Chief Signal Officer, with rank of captain.

1 Chief Signal Officer, with rank of 1st lieutenant.

1 Inspector of Small-Arms Practice, with rank of captain, to be detailed for temporary duty from the line, without giving up his company command.

It is a question whether there should be an engineer officer or not. The duties are of a technical character that no amateur can possibly perform, and in time of war a U. S. officer would unquestionably be given the assignment if needed.

This would be a *military* organization, it seems to me, and if care were taken to select men with the requisite technical qualifications, men whose civil occupation is in the line of their military office, and they held the position during good behavior, not at the caprice of a partisan political administration or on account of personal relations to the appointing power, would give us an administration that would go far towards making our State forces genuine military organizations, able to do the work they are designed to do.

XUM

MILITARY RAILWAY TRANSPORTATION.

By Captain FRANK WEST, 6th U. S. Cavalry.

THE invention of railroads has added a new branch to military science, to which we Americans have paid very little attention, but which in Europe has risen to be one of the most important branches of the military art. All the officers of the General Staff of the European armies are engrossed with the subject of the movement of troops and supplies by rail.

The creation of railroad and telegraph lines has brought about great changes in the character of the theatre of operations, and hereafter railways will play a very important part in the game of war. Large numbers of soldiers and vast quantities of munitions and supplies can be transported long distances over these roads in a few days' time when they are properly managed. As a result, a state whose army is so organized as to admit of its transportation to the frontier quicker than that of its adversary will, with equal forces, by this means greatly advance its chance of success. It is a German maxim that "mistakes made at the outset in the assemblement of an army, cannot be repaired during the entire course of the campaign."

As an example of the truth of this principle I will cite the following from Count Von Moltke's history of the Franco-Prussian War:

"During the late war the French intended to cross the Rhine at once, near Strasburg, but railway accommodation was insufficient to concentrate immediately more than 100,000 men at that point; 150,000 men had to remain at Metz awaiting transportation, and 50,000 men encamped at Châlons as a reserve. The regiments were incomplete as to numbers, and the reserves called out to fill their places choked railway traffic. No magazines had been established beforehand. In short, general provision for an advance was utterly inadequate.

"Germany on the contrary was all ready, every point regarding transportation, supplies, etc., had been thoroughly worked out in advance, and when the order was given everything moved like clock-work. The consequence was that the French were outnumbered, outmanœuvred, and outfought at all points, and in a little over two months, all their regular troops were either killed, captured, or shut up in Paris."

When the war broke out in July, 1870, the Prussian General

Staff were able to issue complete time tables for moving the army to the frontier. For this purpose nine different lines of railway were used, one or more army corps being assigned to each line, which were afterwards used to supply the corps during the campaign. This Prussian concentration was on the largest scale ever attempted by rail, over 330,000 men and 100,000 horses with necessary carriages being assembled within a period of ten days.

In unpleasant contrast to the military order and discipline displayed in Germany at that time is the wildly different scene enacted in France, notwithstanding the fact that the question of railway transportation had been carefully considered the year previous by a commission under Marshal Niel. There was great lack of administrative power and of discipline, regiments arrived in Paris hours ahead of the time set for their departure, and as a result the men were carried off by their friends and became drunk and lost a good deal of ammunition. Other regiments were started off before being filled to their war strength, the trains going only partially filled. After the third day the stations began to be choked up with men of all arms seeking to join their regiments which had preceded them. As a result, these men, being without rations, pillaged the freight cars of the supplies intended for those at the front.

"The French also tried to carry on the movements of concentration simultaneously with the movement to the frontier. The Germans allowed no unit to move until it was ready in every detail, then came the concentration of the troops in their own districts, and finally the strategic movement to the frontier. In France they tried to do all these at the same time. Men of all arms swarmed into the railway stations, the railways thus were obliged to transport at the same time reservists, mobilized troops, single individuals, horses, materials and supplies. All was in the greatest confusion on the frontier, where nothing had been prepared for facilitating the collection of such discordant elements.

"The bulk of the traffic was directed on Metz and Strasburg, and confusion reigned supreme at these cities. At Metz, with eight freight depots and four miles of side tracks, the conveniences were ample for unloading—with proper organization. But no one seemed to know what was to be done with the troops or stores upon their arrival. Cars with material remained unloaded, blocking the tracks, and when the troops arrived the men left the cars, but did not unload their baggage and wagons. These trains had to be got out of the way of those coming close behind, so the first trains had to be sidetracked, and the sidings soon got filled up, and trains had to stand upon the main lines; and so, in the words of a French writer, the traffic at the Metz station became, as it were, 'crystallized into a solid mass.'"

The same state of affairs occurred at other stations. The order in which railway transportation was to be carried on had not been wrought out in advance, and when the time came, the military staff made demands on the railway officials which it was impossible to execute.

Since the severe chastisement received by France in 1870-71, she has made great improvements in her railroads, and has built military railways connecting all the important points upon her eastern frontier. The French and German nations have advanced far ahead of all other European countries in constructing strategic lines. They stand alone in possessing railroad material in sufficient abundance to transport their entire field armies, and at the opening of the next campaign each nation will be able to throw at once upon its frontier more than a million of men and 300,000 horses, an immense quantity of war material.

The study of the strategic value of railways as a branch of the military art was first begun in Germany, in 1864, by the creation of the "Railway Section of General Staff," which immediately found employment in the Danish war of that year, and was employed to much greater extent in the Austrian war of 1866. The officers of this section work out all the details of moving troops by rail, the time required to transport them, and the lines to be used in concentrating their armies on the different frontiers in case of war. To this end the officers are required to know the capacity of the different lines of railway, both at home and abroad, and to keep themselves posted as to all new lines of railway, and also as to their strategic value.

The duties of the railway section are considered so important, in view of their influence in effecting the speedy concentration of armies, that *all* officers of the General Staff are required to serve in it. The "Chief of the Section" is a field officer who is assisted by 26 officers and a registrar.

The United States Army is very unfortunately deficient in not having a good general staff, though there has recently been created in the Adjutant General's Department a "Division of Military Intelligence," that may eventually supply to some extent this great need of our service.

One of the problems solved by the German general staff is this: It has been calculated that,—allowing 13 miles a day for the march of an army and assuming that railroad trains would average 16 miles an hour,—the transportation of an army corps

would require 11 days in moving 150 miles over a single track; and that the same corps could march the 150 miles in the same time (*i. e.*, 11 days); therefore there is a minimum distance, under which the employment of railroads for moving troops would not result in any advantage; and for an army corps that distance is 150 miles over a single track, or 100 miles over a double track. As an illustration of this fact, the French made the attempt in December, 1870, to transport the army of General Bourbaki with great celerity from the upper Loire to the valley of the Doubs, which failed for lack of sufficient preparation and of unity in the execution. Seven days were employed merely in embarking the two army corps, and ten days more were used up in making the journey, which it was calculated would only require one-half that time. It would have been wiser to have marched the troops, the distance being only 140 miles, since they only averaged by rail 8 miles per day.

Railways in British India.—In India, all the railroads are owned by the government, and were built principally for military purposes. For the purpose of transporting troops with rapidity for long distances, railroads are now constructed to every province in India. Experiments are made in shipping troops with their baggage from point to point, in order to accustom them to loading and unloading quickly. The arrangement of cars preferred for this purpose is with end doors, so that the cars may be loaded successively from one end of the train to the other.

I believe it would be a good plan for our troops, during their autumn manœuvres, to concentrate,—for at least a part of the distance they are to go,—by rail, in order to accustom the horses to the cars, and to teach the men to load and unload quickly. With improvised platforms, it is a very difficult job to load up wagons upon flat cars, and secure three on a car, as one will find upon trial. A long platform is the most convenient affair to load from, even with horses, as there is plenty of room to work upon and several cars can be loaded at the same time.

The British government in Canada has recently been experimenting with specially constructed cars for carrying troops across the continent from Halifax, N. S., to Vancouver, B. C. One car was constructed as a kitchen, with regular cooks attached, and the passenger coaches were like our tourist sleepers. The experiment was a success.

Railways were first used in 1825, and for war purposes were

not in general use until the Italian campaign of 1859. They were used to a still greater extent in our Civil War of 1861–65, and have since been used in all European wars.

European governments own a great number of military lines, and build new ones for military purposes when deemed necessary for the protection of their frontiers, during peace as well as in war.

In our country all railroads are owned by private corporations, but the President is authorized by the act of Congress of January 31, 1862, when in his judgment the public safety may require it, to

"take possession of any or all of the railroad and telegraph lines in the United States, the rolling stock, their offices, shops, buildings, and all their appendages, and to prescribe rules for using and maintaining, and to extend, repair and complete the same in the manner most conducive to the interest of the government, and to place under military control all the officers, agents, and employés, belonging to the lines, so that they shall be considered as a post road and a part of the military establishment of the U. S., subject to all the restrictions imposed by the Rules and Articles of War."

By special enactments the U. S. is also authorized to run its own rolling stock over land-grant and bond-aided railroads, free of charge.

Our railroads were used extensively during the war for moving troops and supplies. General Sherman in his Memoirs states that during the Atlanta campaign the railway supply trains

"were operated under military rules, and ran about 10 miles an hour in gangs of four trains of ten cars each. Four such groups of trains daily made 160 cars, of ten tons each, carrying 1600 tons, which exceeded the absolute necessity of the army, and allowed for the accidents that were common and inevitable. * * * That single stem of railroad, 473 miles long, supplied an army of 100,000 men and 35,000 animals for the period of 196 days, viz.: from May 1 to November 12, 1864. To have delivered regularly that amount of food and forage by ordinary wagons would have required 36,800 wagons of six mules each, allowing each wagon to have hauled two tons 20 miles each day, a simple impossibility in roads such as then existed in that region of country."

General Sherman states as examples of the movements of troops from one theatre to another, that: the 11th and 12th corps, 23,000 men, were moved from the Army of the Potomac to Chattanooga—1192 miles—in seven days; and the Army of the Ohio, 15,000 men, from the Valley of the Tennessee to Washington, D. C.—1400 miles—in eleven days; which was a great deal better than was done by France in 1870.

In this country at the present day, most of the concentrations

of troops during actual war, as well as changes of stations of regiments in time of peace, are made by rail. With regard to the kind of coach or freight and stock-cars furnished for the use of the government by our roads, that generally rests with the railroad officials, who, when the movement has to be executed in a hurry, generally supply those nearest to hand, regardless of fitness or of comfort to the troops or horses.

The car at present in use best adapted for the transportation of soldiers is the "Tourist sleeper," which is supplied with bunks upon which the soldier can unroll his blankets and sleep comfortably. Some of the cars are also supplied with cooking stoves, a great convenience, especially if a train gets fastened in a snow blockade. Each car will carry 48 men, and at our present numerical strength it would require on an average one car to a troop, and eleven cars to a regiment; these, with two Pullman sleepers for the officers, would transport the whole of a regiment.

For the shipment of horses, there has been a great improvement of late years upon the ordinary cattle cars formerly in use. The present cars are well ventilated, and the horses can be watered and fed hay and grain in them without wasting the forage. This saves time, which is a great advantage, as the horses should be got through to their destination as soon as possible, it being very hard upon them to ride in cars. The latest improvement in the style of horse-cars is the "Palace," in which the animals can be easily fed, watered in the cars by means of pipes, and kept in well padded stalls so arranged that the animals cannot be injured by the jerking and jamming of the cars. If these cars were also provided with steam heat in winter it would be a good thing. They will hold from 18 to 20 horses each, requiring 40 horse-cars for a regiment.

For its baggage each troop should be allowed one freight car for rations, forage and field equipage. The total number of cars necessary to move a regiment of cavalry would therefore be 65. This train could be divided into three sections, one squadron to each section. In time of peace the sections should travel at least six hours apart in going long distances, to permit of watering and feeding the horses at regular stations, without delaying each other.

In time of war the trains must follow each other as rapidly as safety will permit. In the war of 1870-71 the French at times ran trains less than ten minutes apart and that would seem to be

about the minimum interval that could be allowed commensurate with safety. If trains ran 15 minutes apart it would require 29 hours to move the 105 trains of an army corps.

An example of what can be done by railroads in recent years, was shown in the autumn manœuvres near Schwargenau, Austria, in 1891, when the Franz-Joseph Railway carried 70,000 men from the scene of the manœuvres, without a single accident or delay, in the short space of 36 hours.

General Remarks.—Colonel Derrécagaix states that "a well-planned system of railroads, which will allow the forces of a country to be concentrated in the shortest possible time, is, then, an offensive arm of the first order. It constitutes, at the same time, an instrument of defense more efficacious even than fortresses, for the first step in the preparation for defense is the assembling of sufficient forces upon the frontier in time to prevent access of the enemy. * * * It is especially with reference to the feeding of armies that railroads have produced unexpected changes, and have become of paramount importance. * * * To-day, railroads, seconded by the telegraph, permit the defensive to leave its supplies in the principal cities of the interior, or in the same places as in time of peace, and to receive them with the least possible delay."

As a result of experience, in the wars of the future, armies will also construct new branch lines in their rear, for convenience of hauling supplies and moving troops, as was done by General Grant from City Point to near Petersburg, Va., and by the Germans around Metz.

As an example of the great changes railroads have made in modern war in fixing the lines of operation, bases of supply, and duties of troops, offensive and defensive, Van Horne states in his "History of the Army of the Cumberland," that from the beginning to the end of the war, that army fought exclusively along lines of railroad, was supplied wholly by railroads, had its depots at railroad centres, fought for the possession of the railroad centres of the enemy, and in general was compelled to adapt its strategy and its tactics to the novel conditions imposed by the invention of railroads, and the total changes in the methods of transportation that had occurred since the great Napoleonic wars, from whose records students of the military art had hitherto derived their knowledge.

Comment and Criticism.

(The remarks under this head have, generally, been invited by the Publication Committee, which desires that, as far as practicable, these "Comments" should appear under authors' names.)

I.

"Management of a Post Hospital."

Lieut. Col. A. A. Woodhull, Med. Dept., U. S. A.

CERTAIN "otherwise estimable" members of the medical corps are charged with a deplorable weakness by a critic whom a service paper, quoting with apparent approval his observations in the JOURNAL, describes as candid and as using no uncertain words. Candor and directness of speech are valuable qualities in a critic, as are breadth of view and an appreciation of the relations of things. These deplorably weak brothers who attempt to do their whole duty find themselves cut off by implication from their comrades who are "bent on maintaining their old-time reputation for zeal and devotion to their profession," apparently by neglecting in part the newer functions that changing conditions impose.

Some old dogs do not learn all the new tricks, it may be asepsis, or metric tables, or bearer drill. But what a bad state of affairs, to be sure, these separatists, these unsatisfied new lights, are inducing. Examinations unfortunately have failed to eliminate these military people, but one can pick them out without such aid; and were they only numerous enough how surely would that part of the service be in the jaws of the demnition bow-wows. Meanwhile how gratitude swells before a Mentor's voice!

It would be a more serious matter did the facts in any degree sustain the indictment. Every now and then the Medical Department has its detractors to meet, although usually they are not of its own household. Here is the accusation that "there is too little industry and useful medical and surgical work" in those addicted to this sort of thing, and the inference is that all the rest of us are burning alive with professional zeal. But it *has* been charged, doubtless unjustly, that some of us who "are doctors and not soldiers," as we like to be regarded, are too busy with private practice to feel a lively interest in the non-paying patients of the garrison; it has been alleged, certainly through envy, that the highly scientific members are too much taken up with microscopes and re-agents to care for fevers and pulses; the siren of natural science and the allurements of popular fame seem, but doubtless only seem, to lead some of us away from the restraints of discipline, grudging the hours and the dullness of sick-call and rounds and the untimely interruptions of our higher work; and it is even now and then said that the gun and the dog will attract the enthusiast from the bedside to the cover, from the hospital to the field.

But it is inconceivable and it is not a fact that the medical officer whose inclination and whose sense of duty lead him to take up seriously those functions imposed by his official position, who watches his individual men day by day with the care that exact and minute interest in details engenders, can neglect their well-being. Cordiality and discernment are not lessened by attention to duty. Arrogance or haughtiness is no

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necessary part of soldierly character, and the most perfect dignity may consist with a warmth of heart and kindliness of disposition that all can recognize.

The systematic care of men exercised by the truly military officer always meets with suitable response, and the patient is very rare who fails to appreciate it. Personal manners are a part of the personal equation, and sentimental slopping over is not necessary to awaken the liveliest interest on the one part or gratitude on the other, or to let the soldier feel that the officer is at one with him in a desire to relieve suffering and prevent distress.

The author of the original paper is too well known by those who know anything of the personnel of the corps to require professional commendation or defense. If his practical standard in medical work were kept up all along the line it would be a happy day for sick and well. The affair of Wounded Knee, where two of his detachment won medals of honor, shows that training in the post leads to efficiency in the field in this as in other branches of the service; and the Seventh Cavalry may safely be called as witnesses should there be any real doubt that thoroughness of military work does not sacrifice professional skill or personal interest.

Lieut. Wm. H. Smith, Adjutant 10th U. S. Cavalry.

In his remarks on the "Management of a Post Hospital" in the July number of the JOURNAL Dr. Woodhull says "Akin to this is the physiological disadvantage of evening guard mount. It is much more trying to men to begin a tour of twenty-four hours' guard at the end of a day than after a night's rest. The disturbed sleep of the night on guard tells severely in the next day's duty.

For several years I have been an advocate of evening guard-mount and for the following reasons:

First. Men marching off guard in the evening have the whole night before them in which to make up for lost sleep and get ready for duty, instead of some three hours (from about 10 A. M. to 1 P. M.) as is usually the case when guard-mount takes place at 9 A. M. Very few men are so constituted as to be able to sleep in barracks during the day, hence when they march off guard in the morning and go on duty again at 1 P. M. they are usually tired out from want of sleep and perform whatever is required of them in a more or less unsatisfactory manner.

Second. When guard is mounted in the morning, practically three guard details are taken from the troop or company and are unavailable for troop or company duty and instruction during the whole forenoon, viz.: the detail which marches on guard, the detail which marches off guard and the old guard fatigue; while when the guard is mounted in the evening only two of these details are unavailable, viz.: the men actually on guard and the old guard fatigue.

Third. Guard-mount in the morning practically breaks up the whole forenoon, making it very difficult to pursue any systematic course of instruction either before or after, owing to the limited time.

Fourth. The most important part of the tour of guard duty either in the garrison or field is during the night, and men marching on in the evening are fresher and able to perform it better.

As to sick call it seems to me that from a military point of view it is better to have it in the evening, especially in a cavalry command. The morning in a cavalry troop is a very busy time. After reveille the men must have their breakfast, barracks and mess room must be put in order, barrack grounds policed, the horses fed and groomed, stables policed, dumps hauled off and fresh hay hauled in. Then if drill or target practice immediately follows, this being usually the best time for these duties, it is frequently a matter of some inconvenience to spare a non-commissioned officer to

march the sick detail to the hospital and also the detail itself, as this is usually composed of men only slightly sick and able to perform duty, as others more seriously hurt or sick would have been taken to the hospital whenever the illness or injury occurred.

Details from post headquarters are usually made one day ahead, the only common exception being emergency fatigue details and details for detached service, so that as far as these details are concerned, it makes no difference whether sick call is in the morning or evening.

I submit the foregoing simply as military considerations, and disclaim any intention of intruding on the physiological grounds of the Medical Department.

II.

"The Judge Advocate's Department."

Lieut. Wm. E. Birkhimer, Adjutant 3d U. S. Artillery.

COLONEL CLOUS, in his brief but lucid historical sketch of his department, necessarily omits many matters of interest relating to the administration of military justice in our army. And that such administration is of vital interest thereto a striking illustration now is exhibited at St. Paul, Minnesota, where an officer, having been acquitted before a United States Court of the crime of murder, is being tried for the offense against discipline involved in the military aspect of the same act.

During the Revolutionary War and for some time afterwards a general court-martial could only be composed of thirteen (13) members, as was the practice in the British army. After the independence of the colonies was acknowledged, the American army was disbanded in 1783 almost to a man, and, prior to the adoption of the Constitution, but few troops were raised by authority of Congress, and these for the sole purpose either of protecting settlers from hostile Indians or suppressing Shay's rebellion in Massachusetts, the latter, however, collapsing before the national troops arrived at the scene of conflict.

During this period the troops in service were very widely scattered, but few being, as a rule, stationed in any one place. They were raw, comparatively undisciplined, and military offenses were naturally quite frequent. Yet, from the fact that not less than thirteen members could constitute a general court-martial it was liable to happen that both officers and men would remain in arrest for many months and then be released without trial, not by any means because they did not deserve it, but because of the impracticability of convening the number of officers necessary for a general court-martial. This was a great evil, and to cure it Congress passed a resolve on the 31st of May, 1786, providing that a general court might be composed of any number from five (5) to thirteen (13) officers, inclusively, adding, however, a clause to the effect that the latter number should be selected unless manifestly prejudicial to the service. This remedial resolve brought the required relief, and remains the law to this day. An interpretation was at once given to the limiting clause, lodging in the convening authority the power to determine what number of officers could be convened without manifest injury to the service.

This rule was not questioned by the regular army, although, had it been given to such practices, the language of the statute, in such a code, gave a fair basis for difference of opinion; but when the militia took the field during the war of 1812, being officered largely by lawyers who knew nothing of army practices, their eagle eyes at once discovered in this limiting clause full authority for the culprit, instead of the con-

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vening officer, to determine the important question there involved. Out of one of these militia trials came the United States Supreme Court decision of *Martin* versus *Mott* (12 Wheaton 19-35), which definitively decided the question as regular army custom had done before the militia appeared on the scene.

Section 1202 Revised Statutes authorizes judge advocates of courts-martial to issue process to compel witnesses to appear and testify. It is an interesting question how far this statute warrants a court to go against a recalcitrant civilian witness who, being before it, refuses to give evidence. The construction given the law by the War Department is that all the court can do is to remove the civilian from its presence, without punishment. The soundness of this construction is not here questioned; but it is manifest that its practical operation may be to defeat the ends of military justice at critical periods, and in important cases. A careful reading of the law, viewing it in the light of antecedent legislation and attempts at legislation upon the same point, leads us to conclude that the lawmakers intended not only that the civilian witness should be compelled to appear, but also that he should be compelled to testify: nor do we forget the rule of construction that the intention of the legislature, when discovered, must be given effect; yet, notwithstanding all this, it is not conceded that the court has authority to coerce the witness.

The case is singular, still it is not difficult of explanation: firstly, the law carries no sanction to enforce its decree, and a law without a sanction is no law; second, although we are bound to give effect to the legislative will when this is ascertained, this canon of construction is governed by another still more potent, namely, that to ascertain what that will is, we first must resort to the language used by the legislature to express its will—namely, the law itself; and, if the language used, no matter what the legislative intent, does not give expression to the latter, we are not permitted to piece out the language the legislature has used, and thus make a law for them. The difficulty with Section 1202 Revised Statutes is of this kind; there should have been added a sanction by which its injunctions could be enforced; and, to that extent, it is no law.

Our sturdy ancestors understood the importance of this matter. A civilian witness having refused to testify before one of the early courts-martial of the Revolution, a resolve of Congress speedily gave such courts authority to punish similar conduct, and this remained the law for ten years—down to the resolve of Congress, May 31, 1786, before mentioned. Thus affairs rested until 1808. In that year, John Randolph of Roanoake made an onslaught in the House of Representatives upon General James Wilkinson, commanding the Army of the United States, charging him, among other crimes, with being a co-conspirator with Aaron Burr. Randolph's motive was perhaps revenge. Wilkinson had posted him as a coward, and he had been read out of the Republican party by the Jefferson Administration: he therefore hoped to smirch the former, and annoy the President in the last days of his power. He was aided and abetted in this nefarious work by Daniel Clark, the delegate in the House from Louisiana.

Wilkinson called for a Court of Inquiry. Both Randolph and Clark had launched their anathemas from the safe covert of the House; besides they were not willing to take the stand and be cross questioned regarding their statements. In this dilemma the Administration extended a friendly hand to the persecuted soldier; its friends in the House brought in a bill to compel civilian witnesses to appear and to testify before all military courts under heavy penalties, to be inflicted by the civil courts, through whose instrumentality subpoenas in such cases were to be served. After a bitter struggle in the House, in which the constitutionality of the bill was both assailed and vindicated with great ability, it passed by a large majority; went to the Senate where it passed

with amendments; was returned to the House, where the few remaining days of the session prevented its being acted upon. Thus perished the principle that the regular soldiers of the Republic, like its other citizens, shall be given full opportunity to develop all evidence for their defense when unjustly assailed. But it should be put down to Mr. Jefferson's credit that he was a zealous advocate of this bill.

Thus matters went until the present section 1202 Revised Statutes became the law, the weakness and imperfection of which have been pointed out. Attention it is true was occasionally drawn to this blemish of the code, particularly by that wide-awake Secretary of War, Mr. Poinsett, but nothing in a legislative way was done until the passage during the War of the Rebellion of the act now embraced in section 1202.

The militia, as usual, fared better. By chapter 82, Act April 18, 1814, section 4, authority was given militia courts-martial to punish witnesses either summoned and not appearing, or who appearing refused to testify. The passage of this bill was vehemently opposed by the moribund Federalist or Anti-War party; but the desperate condition of our affairs called for the rejection of half-way measures, and under this pressure the Act was passed, but the unusual powers conferred expired with the war that called them forth. The circumstance is illustrative of the generally manifested disposition of our early legislators to do that for the militia which they would not do for the regular army. Indeed it was remarked in the debate that the former could be trusted with such power, while the latter could not; an insinuation the unjustness of which is testified to on every page of our national history.

No lover of his country and its institutions will gainsay the truth of the general principle of our national polity which holds that the military should be subordinate to the civil power. But it is of only limited applicability: each has its appropriate sphere in which it is supreme. And sometimes the military subordinates the civil power to itself, as General Jackson did at New Orleans in 1814–15, the union generals at St. Louis from 1861 to 1865, the military at Homestead, Penn., and the Coeur d'Alene mining regions, Idaho, not to mention many other instances of recent years in this country. In this connection G. O. No. 15 dated A. G. O. May 25, 1894, is pertinent and interesting: but its precepts are anything but consonant with the tenets of the common law regarding the subordination of the military to the civil power.

It is natural that Colonel Clous should dwell admiringly upon the virtues, the learning and the services of the sages of his department. But he will excuse us of course, on the broad principle of charity, if we do not in every respect partake of his enthusiasm. For some of these noble characters a sense of propriety alone prevents our speaking of them in terms of admiration which is justly their due; and we doubt if even the army appreciates how much it is indebted to them for untiring efforts to maintain their own high standard of honor among the profession. And in this respect we cannot but think that scant justice has been done to his predecessors of the period prior to the War of the Rebellion. We cannot forget that characteristic story told of the grim war secretary, "State your case, Holt will find the law," which reminds us of Richard III., "Off with his head, so much for Buckingham." There were a good many decisions of that kind during the war, and they were necessary, but we would not select them as the most fitting foundation upon which to build a system of jurisprudence, military or otherwise.

To the proposition that to Winthrop's law treatises the army is indebted for the first collection of "precedents, decisions and opinions which have become part of our law military" we cannot agree. Our dissent is based on two grounds, first, that De Hart, Benét and Ives, at least preceded this author with treatises equally as acceptable to the army; second, that much in the favorite treatises is not and never was the law. It is true that if mere bulk be considered, page piled on page, document on document,

Pelion on Ossa, the favorite treatises stand without a rival. But opinions may honestly differ about this necessarily being an evidence of merit. When, however, we find that this author has attempted to interpolate the word "directly" into the 62d Article of War before the words "to the prejudice, etc.," we cannot but feel solicitous for the resulting consequences to discipline.

Another favorite theory of our favorite author is that courts-martial are criminal courts. There was a time when they were considered to be courts of honor. When did they cease to be such? An incident on the Many court-martial a few days since is interesting in this connection. Counsel for accused interposed the plea *autrefois acquit;* the judge advocate, replying to argument of counsel said, addressing the Court: "Now, the philosophy of this matter in a nut-shell is this: We, gentlemen, are made the custodians of our honor. It is given to us to keep the service pure. There are no legal means by which officers who make violent breaches of discipline can be eliminated from the service except by court-martial, etc." This was an appeal to the court as men of honor. It savors nothing of the criminal court theory. It is an ennobling and inspiriting sentiment. As such we hail it with delight, trusting that it may prove to be seed sown upon good ground.

III.

"The Military Hand Litter."

Lieut. H. R. Stiles, Assistant Surgeon, U. S. Army.

WHILE reading Major Havard's article under "Comment and Criticism" in the July number of the MILITARY SERVICE INSTITUTION JOURNAL, in which he speaks of his attempts to reduce the weight of the litter by diminishing the size of the side-poles, a simple application of the principle of the truss suggested itself to me, as perhaps making such a reduction possible. The application of the truss to the litter-pole is not original with me, but I have never seen it applied in the way that the following sketch illustrates.

The following sketch illustrates my idea:

A, A, are the side-poles; B, B, are the legs; C, C, C, is a light steel safety-chain or wire, passing from the junction of one handle with the side-pole to the nearest leg, then across between the legs, and up to the junction of the other handle with the side-pole, forming a truss, in which the legs of the litter are utilized as struts.

In order to distribute the strain as evenly as possible along the side-poles, I would move the legs six inches nearer the centre of the litter than they are at present, thus making the greatest length of unsupported side-pole two feet six inches. This would permit of a very decided reduction in the size and weight of the poles, and, as much of the strain of the load is taken by the inelastic chain or wire, the "blanket-tossing" motion of the loaded litter, when carried, would be done away with for the most part. The change in position of the litter-legs would affect its position on the travois but little.

The wires or chains would be but little if at all in the way. They would not interfere in the least with any of the uses to which the litter is to be put (ambulance, travois), and would, I think, permit of the removal of material enough from the side-poles to much more than compensate for their slight extra weight.

"There is nothing new under the sun," and I have little doubt but that this very idea was tried and abandoned long ago. But as I have not seen it spoken of in any of the literature that I have been able to consult, I thought it worth mentioning. It is but an idea as yet. I have made no experiments to determine whether it is practicable or not, though I intend doing so, unless some one better informed on the subject is kind-hearted enough to tell me that I am following an abandoned trail.

The experience I have had with the new litter makes me fully in accord with the changes that Major Havard advocates in his article. The faults that he speaks of are apparent to any one who has drilled much with it. The individual sling is surely a step in the right direction, not only in that it lightens the litter, but in that it simplifies the drill (something to be devoutly wished where one has all the troops of the command to instruct, as is the case at this post), and lessens the time required to open or strap litter, or to get under way with the loaded litter.

Major Hoff's method of securing the straps for the canvas by pin and ring is a decided advance over the present method with the snap-hook. But might it not be still further simplified by having the strap made in two pieces, each fast to a side-pole, as Major Havard suggests, with an ordinary buckle on one of the straps in such a position as to be on top of the canvas when the litter is strapped? By having the fastening in this position the man can see what he is doing, and has no inclination to turn the litter over to get at the fastening, as is the case with the present arrangement, and as would probably be the case with any fastening that is out of sight. In addition, the projecting pin, which might injure the hands of Nos. 1 and 4 in passing obstacles, or catch in the blouse of Nos. 2 or 4 in carrying the loaded litter up or down stairs, is done away with.

The weight of the litter is, however, its greatest present objection. This can be decidedly reduced, and at the same time the liability of the leg to break when the litter is used on the travois (as has happened here) be diminished, if the leg is made of wrought iron, in the form that Major Havard has suggested. And a still further and very decided reduction may be effected, if an alloy of aluminum be used in the place of iron or steel. An alloy of ninety-seven parts of aluminum with three parts of copper has a tensile strength of 54,000 pounds per square inch (nearly equal to the best wrought iron), while its weight is about one-third that of iron. If this were to be used for all the metal parts of the litter,* and the present fixed sling replaced by the individual sling, the weight of the litter would be reduced some five pounds; and this reduction would be still greater if the legs were made in the form of a plain loop.

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* The weights of the legs and braces of the litter as made at present, and as given by Major Hoff, in his article in the May number of this JOURNAL, are: legs, 1¼ lbs. each; braces, 2¼ lbs. each; the slings weigh about 1 lb. each.

Reprints and Translations.*

THE OFFENSIVE TACTICS OF INFANTRY.

(AS EXEMPLIFIED BY THE BATTLE OF SPICHEREN.)

"That the normal attack is not advantageous may be shown by the real impossibility of its employment before the enemy. * * * It is only possible on a perfectly level drill-ground, and totally unserviceable and detrimental on the majority of battle-fields."—VON SCHELLENDORFF.

BY MAJOR G. F. R. HENDERSON.

From the United Service Magazine.

ON the morning of August 6, 1870, nineteen days after France declared war against Prussia, a Prussian officer, Lieut.-General von Kamecke, found himself at the head of his division, within four miles of the frontier. He had been ordered to p'ace outposts on the heights north of the river Saar, the French being in possession of the country on the other bank.

He had reached his position at half-past nine o'clock; and he saw in the valley below him the little town of Saarbrucken, with its three bridges, and beyond, overhanging the stream, on the far side of the river, a long ridge, two or three hundred feet high, barring the view southward.

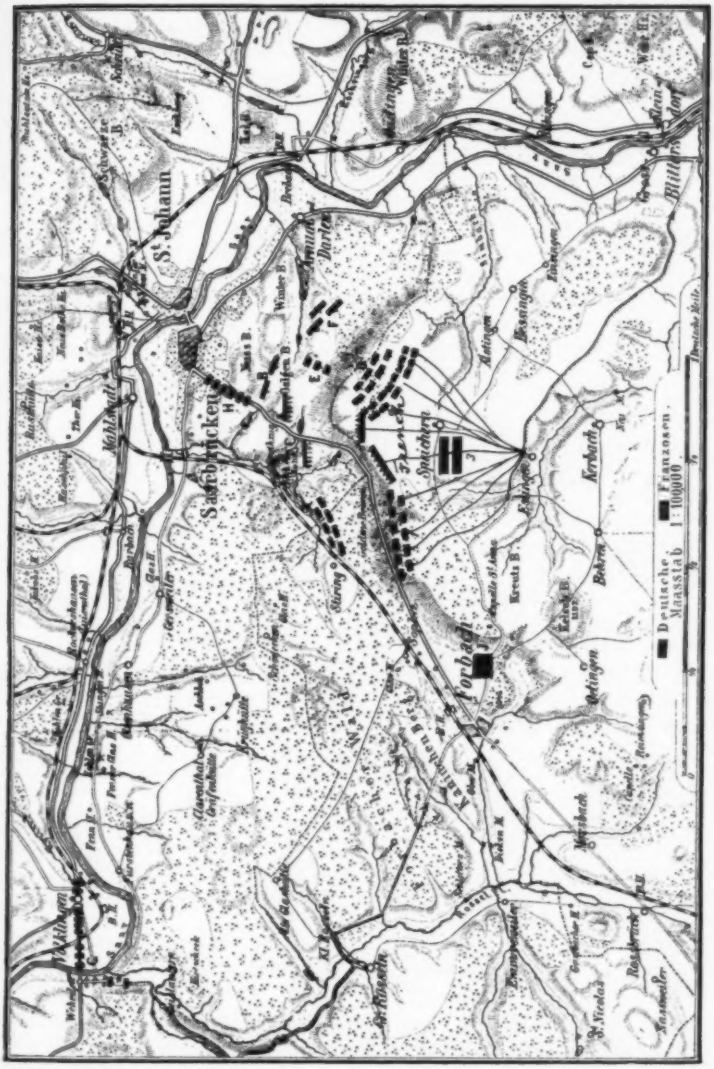
On this ridge, commanding the bridges at close range, French infantry and artillery had been posted for some days past; but when Von Kamecke's troops arrived on the opposite heights not a sign of the enemy was to be observed, not even a solitary sentry or vidette.

Von Kamecke sent on the information to the officer commanding the 7th Army Corps, to which his division belonged, and requested permission to occupy the ridge. He was told to act on his own judgment, and at 11.30 his advanced guard crossed the river and ascended the high ground.

From his new position a wider prospect confronted him. But here again a steep and densely-wooded height, rising abruptly from a level and unobstructed valley, about 2000 yards in breadth, closed the view directly to the south. This height was the northern edge of a broad plateau; and at the angle, immediately facing him, the wood ceased, and a spur shot out, to which the red earth of its scarped sides has given the name of Rotherberg.

West of the Rotherberg was a long valley, running up into the plateau, closed at the far end by a conical-wooded hill, and bounded on the right by a dense forest. Half way down the valley, through which ran the great high road, the line of advance and retreat for both French and Germans,

*Please address communications concerning reprints, translations and reviews to Lieut. J. C. BUSH, editor of this department.



beyond a great copse of elms, rose the tall chimneys of the little industrial village of Stiring Wendel; and under the slopes of the plateau, a few hundred yards northeast, stood a substantial farm called the Baraque Mouton, and an inn with the sign of the Golden Bremm.

But there was more to be seen than the features of the landscape. On

the Rotherberg was a French battery, and some infantry in shelter trenches; whilst the cavalry squadrons, which had been in close contact with the enemy since daybreak, had developed the presence of other troops near Stiring Wendel. The numbers of the French were estimated at about 7000; but the country was densely wooded and observation very difficult.

Von Kamecke, however, had seen enough to determine his plan of action. For some days past there had been a general impression in the German camps that the French were retreating. The sudden abandonment of the ridge above Saarbrucken—a very strong defensive position—and the fact that the bridges had been left intact, confirmed this impression in the general's mind. Believing the force before him to be but a rear-guard, and holding it necessary to drive the battery, which had already caused his advanced guard some loss, from the Rotherberg, he resolved to attack the enemy's position on both flanks.

But before sending his troops forward he made no attempt to reconnoitre the wooded country to the front more closely, nor did he await the reports of the cavalry who were exploring the great forest to the west.

We may give him, as regards the last, the benefit of the excuse that at the beginning of the war the independent cavalry divisions, forming the screen of the army, often failed to work in unison with the advanced guards of the marching columns. The commanders of the latter were often left in ignorance of what was being done in front, and important information, as well as the position of the reconnoitring parties, was never communicated to them. Had Von Kamecke known that two regiments of cavalry in the forest had passed far beyond the left flank of the French, had seen large camps still standing, and had observed no indications of retreat, he would probably have acted with greater caution. We may note, lastly, without going into particulars, that when, at 12 noon, he resolved upon attack, he must have been aware that he could receive no support whatever for at least three hours.

He was so far, however, from manifesting the slightest apprehension of defeat that he did not even wait to make careful arrangements for the coming engagement. His four batteries of artillery were at once brought up; but before they had had time to drive the French guns from the Rotherberg he ordered his leading brigade, the 27th, to attack the enemy's position on both flanks; the other brigade, the 28th, being still on the far side of the river, three miles distant from the field.

He had with him, in his two brigades, eleven battalions—about 11,000 men. Against him, so the scouts reported, were 7000, scarcely so great a disparity of numbers as to make unnecessary ordinary precautions. The position occupied by the French, so far as his information went, was more than a mile and a half in extent, a wide front to be attacked by a brigade of 6000 men, which was ordered, moreover, to manœuvre by both flanks. The rational course, under such conditions, would have been to have moved forward with his two brigades abreast, and to have assigned half of the battle-field to each. No mortal brigadier is capable of directing a front of battle 3000 yards in length; moreover, to occupy it fully he must put nearly the whole of his force in the front line; he will have none left to form a second

line, much less a third, and if a flank be turned or the centre broken he will be absolutely helpless.

To attack a position 3000 yards in length was, nevertheless, the task that Von Kamecke set his leading brigade; and, to increase the risk of the whole proceeding, he ordered his rear brigade [five battalions] to cross the river by the single passage afforded by the railway bridge, a long way to his right, and to attack the enemy's left. This brigade was more than three miles distant from the French position; it had to pass through a defile, and the ground beyond was most unfavorable for deployment. As a matter of fact, it was not in a position to take a share in the action until after half-past two o'clock. Thus for more than two hours the 27th Brigade had to depend upon itself alone. To sum up, Von Kamecke sent 6000 men to attack at least 7000, not only without immediate prospect of support, but with that support coming up in a single column on a flank of the line of battle.

When we find that the French had no idea of retreating, that they had not 7000 men and eight guns, as the Prussian scouts reported, but 28,000 men and ninety guns, his rashness stands out in glaring colors.

To describe the attack of the 27th Brigade as shortly as possible:

Two battalions attacked the French left through the Stiring Copse.

Two battalions attacked the French right by the gap in the Gifert Wood.

Between these two attacks was an interval of just two miles, filled by four batteries of artillery, and two battalions in reserve on the Saarbrucken Ridge.

The artillery brought a heavy oblique fire to bear upon the guns and shelter-trenches on the Rotherberg, and the two flank attacks entered the woods, the outer border of which was unoccupied, and drove back the skirmishers whom they found in the interior.

About one o'clock the French guns, after holding their own for nearly an hour against the concentrated and oblique fire of the four German batteries, were obliged to fall back from the Rotherberg to the higher ground beyond. Von Kamecke, encouraged by the progress of his flanking columns, and seeing, in the withdrawal of the enemy's artillery, evidence of an immediate retreat, sent his two reserve battalions to storm the Rotherberg.

These two battalions had to cross 1500 yards of absolutely open ground, under plunging fire from the height. But the French, about 300 in number, although covered by their trench, were posted on a narrow spur, on which the shells of twenty-four guns were bursting; and the Prussians managed to reach the dead ground at the foot, where they found shelter under a high bank.

But whilst these battalions were still advancing over the open ground, Von Kamecke's precipitation began to have its due result. The right column of attack was pushed back through the Stiring Copse by a counter-stroke, and the brigadier sent two of the seven companies then moving against the Rotherberg to its assistance.

The reinforcement enabled the right column to regain the ground it had lost.

Shortly after two o'clock the 28th Brigade had crossed the river, and

the commander ordered the battalions to follow him through the dense Saarbrucken Forest in order to strike the extreme French left. The different circumstances which prevented this order from being carried out make the action of this brigade a most instructive tactical incident; but it is sufficient to state here that it drifted into four distinct portions, with very little, if any, connection between them; and that, while two-and-a-half battalions were pushing their way slowly through the forest, the other two-and-a-half, more by good luck than good management, found themselves in the Stiring Copse, just in time to beat back another counter-stroke.

At three o'clock, then, the Prussian right was for the moment safe. It was far otherwise on the left.

The French, when Von Kamecke sent his 27th Brigade across the valley, were in no expectation of an attack. Their general was waiting orders to retreat, and he had not made up his mind what to do in case the Prussians crossed the Saar before those orders arrived. In fact, the sudden advance of the 27th Brigade was a surprise, and it was not until after two o'clock that the generals in charge of the right wing thought of making a counter attack. Just before three o'clock a large force moved against the two German battalions who had entered the Gifert Wood, and drove the greater part of them in headlong flight across the valley.

At this moment, Von Kamecke had no reserve left beyond a few squadrons of cavalry. Every single rifle was employed in the fighting line. Had the French right rushed forward, they might have seized the Saarbrucken Ridge, and have cut off the retreat of the German centre and right.

But they did not do so. The counter-stroke, at the moment the Germans were streaming in disorder across the valley, was cut short by the loss of the Rotherberg on the left. A very short time before it was made, as soon as his right column began once more to gain ground through the Stiring Corpse, Von Kamecke had sent orders to the battalion crouching at the foot of the Rotherberg to storm the spur.

The Prussians, reinforced by a company which had just come in from escort duty, ascended the steep face of the hill, nearly 200 feet high, not only without loss, but without being observed, and literally surprised the French infantry on the crest.

The explanation is not far to seek. The French guns had been silenced and for some time the four Prussian batteries had concentrated their fire upon the occupants of the shelter-trench, whilst some troops lying at the foot of the Gifert Wood fired at every man who showed himself above the parapet.

Moreover, the face of the spur was so steep, that the necessity of keeping a look-out was not forced upon the defenders.

This incident, which occurred about three o'clock, ended the first phase of the battle. The Germans had now got a footing on the heights, had gained the edge of the wood opposite Stiring Wendel, had even seized some of the outlying houses of the village, and reinforcements were coming up.

These came from all the army corps within sound of the cannon and reach of the battle-field. From the 3d Army Corps, which did not even belong to the same army as Von Kamecke's division; and from the 16th

Division, which belonged to the same army, but not to the same corps. With these troops came a general senior to Von Kamecke. When he arrived, the French were engaged in trying to push the Prussians (only five companies) from the Rotherberg. But the position was good for defense. The five companies held on gallantly; and, in order to secure their flank and to support them, every battalion that arrived was sent either to the Rotherberg or against the Gifert Wood. Both on the spur and in the wood the fight grew furious. The French gradually developed their strength; and the Prussians, in a strange mixture of troops drawn from different army corps, from different divisions, brigades, and even companies, were fighting under the supervision and direction of their company officers alone. But they had been trained to fight under their company officer, and these officers were skilful and well-practiced leaders; and so, by six o'clock, the French, equally brave but badly handled, yielded the wood and fell back to a strong second position in front of Spicheren village.

Here we will leave the battle in this quarter of the field, merely remarking that on the edge of the plateau, from the gap in the Gifert Wood to the Rotherberg, there were forty Prussian companies in line, of which only twelve were collected together in battalion. The rest were intermingled in most extraordinary confusion, due, first of all, to the haphazard way in which they had been thrust into the fight, and secondly, to the difficulties inherent in wood fighting.

It may be noted, at the same time, that there were no troops in reserve on the Saarbrucken Ridge.

Another success had been won in the centre of the field. The Golden Bremm and Baraque Mouton had been carried by troops from the Stiring Copse. They were not strongly defended, and had been well bombarded by the artillery. Seven companies of the 27th Brigade stormed them about four o'clock; and it may be noticed that the final charge was made by two half-battalion columns in close order, who had to cross three hundred yards of open ground under heavy rifle fire.

But on the extreme right, in front and on the far flank of Stiring Wendel village, the Prussians were in evil case. They had almost encircled the village on the west, but the garrison was strong; heavy reinforcements had been thrown in, and, owing to the woods, it was impossible to bring artillery to bear upon the houses. The attack had come to a standstill by five o'clock; 6000 men were extended over a front of 3000 yards, with brigades, regiments, and companies shuffled in a strange medley, and unsupported by either artillery or infantry. The men were worn out by the protracted struggle. Their losses had been heavy; their power of resistance was strained to the utmost; the little ground that had been won had been purchased at a heavy price, and they were exactly in that condition in which a commander, intent upon a vigorous counter-stroke would wish to find his enemy.

It has often been observed that in fiercely-contested battles a moment comes when the physical and moral vigor of the soldiery relaxes, and the bare aspect of a reinforcement turns the scale. Such a crisis had now arrived. A strong column of French infantry was seen approaching along

the slopes of the Spicheren wood, and the very sight of its gleaming bayonets brought about the retreat of the exhausted Prussians.

One of the senior officers present, without sending for instructions to the brigadier, gave the order to retire, and the whole fell back in the utmost disorder, with the exception of a small rear-guard that still held the Stiring Copse.

But before the attack of five battalions, the first line in column of sections, covered by skirmishers, this rear-guard, although it fought with magnificent courage, had soon to give way, and about seven o'clock the French were pressing forward rapidly through the copse, and again on the Saarbrucken Ridge there were no reserves.

It seems as if a vigorous advance would have driven the Germans right into the Saar, and have outflanked the whole of their artillery, now increased to sixty-six guns, at the mouth of the valley. But at this moment help came from an unexpected quarter. A German division, the 13th, belonging to the same army corps as Von Kamecke's, had crossed the Saar the same morning at Volklingen, seven miles down stream, and had marched to the sound of the cannon, through the great Saarbrucken Forest. Just as the counter-attack had entered the Stiring Copse, it came suddenly out on the road close to Forbach, threatening the French line of retreat, which was guarded at this point by only 200 dragoons and 200 reserve men who had just come up to join one of the line regiments.

The French commander, immediately he got the news, gave orders for the whole of the troops in the valley to retire to the heights, and the advance through the Stiring Copse was abruptly broken off.

Of the remaining incidents of the battle little need be said. The French covered their retirement admirably, and the movement was marvellously well managed. A rear-guard held on to Stiring Wendel till long past dark. The small detachment in front of Forbach held the outflanking troops at bay until it was too late for them then to occupy the town; and on the plateau a dashing counter-stroke, made by troops who had been fighting for nearly eight hours under a blazing sun, nearly drove the Prussians from the Gifert Wood. About ten o'clock the French retreated in good order with all their guns. The Prussians made no attempt to follow them.

Such is a brief description of the part taken in the battle of Spicheren by the German infantry. Some of the lessons that may be drawn from it have been already touched upon, and nothing more need be said about Von Kamecke's action in fighting the battle at all, and on his attacking without thorough reconnaissance.

The great evils which resulted from his attack on a front which was far too extensive for his strength have been alluded to. The weakness of his long thin line at every point, and the subsequent intermingling of brigades, divisions, and even army corps and armies, as supports came up and were shoved into the fight in all sorts of directions, shows the loss of strength and the increase of confusion which arise from such a haphazard method of beginning an engagement. This is one of the most important lessons of Spicheren. It is made the more impressive by the fact that only the attacks and counter-attacks which were made on a narrow front and in great

depth won any decided success; and that those regiments who joined the fight in deep order, one battalion behind the other, managed to maintain their cohesion throughout. The advantage of a deep formation is a point which for a long time after 1870 was completely overlooked. Yet the preliminary arrangements, made outside the zone of fire, which secure this advantage, are, as we see from Spicheren, of the very utmost importance. It may indeed be argued that because the Germans, the successful Germans, neglected them without incurring disaster in 1870, they are matters of small moment. But if the Germans had rated them at their true value, we should have seen but little of that precipitate rush into action which characterized their tactics, the terrible confusion which existed along the front of their lines of battle would have been very greatly minimized, and their victories would have been still more decisive. Of the very great disadvantages of tactical confusion every soldier is aware; but there is one most important point which is not very generally realized. It is well illustrated by what took place at Spicheren.

When, between five and six o'clock in the evening, the Germans became masters of the Gifert Forest and the Rotherberg, of the Golden Bremm and Baraque Mouton, of the Stiring Copse and the outskirts of Stiring Wendel, what had they done towards winning the battle? Very little. They had merely carried the first line; and the troops with which they held it were in such utter confusion, and it was so impossible to manœuvre them, that not only could they do no more towards attacking the strong second position of the French, but on the right wing the very aspect of the bayonets of the counter-attack brought about a disorderly retreat. The capture of the second position was due to the moral effect on the mind of the French commander of a body of troops of unknown strength unexpectedly appearing on his line of retreat, and not to the efforts of Von Kamecke's division and those by whom he had been supported.

Now, this division of a battle into two phases, the capture of a first line and the more difficult achievement of storming a second position, is characteristic of the majority of engagements. Spicheren shows that if the assailant lets his troops get out of hand in the first phase, he will find the second altogether out of his power.

How is the successful prosecution of those two distinct tasks to be provided for? First, by a careful preliminary disposition of the attacking force, whenever it is practicable, before you attack at all; and second, by training all ranks to recognize the importance of maintaining the tactical cohesion of the battalion.

As to the first point, let us go back to ancient history, to the ante-breech-loader days, to the tactics of Napoleon and of Wellington, for, despite the changes that modern improvements have made in tactics, I believe that general principles still hold good, although long-ranging and quick-loading fire-arms have rendered modifications necessary. The secret of success in battle is still the same as it ever was—the application of superior force at the decisive point; and whether that superior force consists, as in the earlier days of the century, in the number of bayonets, or as now, in the number of bullets, the method of assembling that force and of giving

it its maximum effect do not materially differ. The practice of the Peninsula era was this: The front was covered by skirmishers, followed by stronger bodies; and in rear of these first and second lines moved a third, and generally a fourth line, which, kept well in hand, were ready to follow up and confirm the first success. The forces employed in the attack were very carefully drawn up in great depth, disposed so as to strike, from the very outset, an uninterrupted succession of heavy blows, and to overcome the difficulties presented by those successive phases of battle to which I have alluded. When a fresh enterprise presented itself, fresh troops were at hand to deal with it.*

Nor did either English or French attack, as the Prussians in 1870 did almost invariably, along the whole line simultaneously. The decisive point was attacked heavily, elsewhere the enemy was "contained." "The attack was general, the assault local."

It is curious to observe how the French have reverted to old methods, at least so far as careful preliminary arrangements and massing the troops against one particular point are concerned. More than once at the Grand Manœuvres of 1891, under cover of the advanced guards and the whole force of artillery available, a whole army corps of twenty-five battalions was drawn up for the decisive stroke, and its advance in many lines was a practical illustration of the successive waves of skirmishers, which General Skobeleff, and American soldiers before him, held to be the only practicable method of making a decisive assault.

The general consensus of military continental opinion, French, German, and Austrian, is all on the side of very careful preliminary arrangements; and so far as we can gather from the history of the battles of 1870 and 1877, as well as of those of an earlier date, their abandonment, by both Germans and Russians, was by no means justified. If these, then, are the broad lines on which infantry should work—viz., careful arrangements, a precise objective, great depth, and the local assault—the very great importance of manœuvring in close order, the impossibility of divorcing drill and tactics, and of drawing a hard-and-fast distinction between the movements of the parade-ground and the movements of the battle-field, become at once apparent. Skill in handling troops in close order, rapid changes of formations, and readiness in manœuvring in mass, are all qualities which come into play on the battle-field, not only against savage enemies and in night attacks, but under ordinary circumstances, as essential preliminaries of the combat.

On the second point—the unity of the battalion—it is unnecessary to dilate. It is evident, if battalions are kept together throughout, that although the companies get mixed up, they will not take long to rally and to find their places, ready for a further advance when the enemy falls back from his first position. But to keep the companies together in broken ground or in wood fighting demands the constant attention of the company

* Wellington's great counter-stroke at Salamanca, described by Napier, is an excellent example, and many parallel instances are found in the history of the Napoleonic wars. Many of the great attacks in the American Civil War—notably those at Chancellorsville, Chickamauga, Chattanooga, Gettysburg, and Spottsylvania—were made in identically the same formation, as was Osman Pasha's magnificent endeavor, thwarted by untoward circumstances, to break out of Plevna.

leaders, and careful precautions on the part of the battalion commander. In both these respects the Germans failed.

Another point on which we may draw instruction from Spicheren has to do with battalion formations for attack. It is impossible here to go into details of the various formations adopted, but the following reflections are the outcome of a close study of the movements of each single battalion.

Many of the battalions advanced to the attack in the same formation. But this formation had always to be modified immediately they came under fire, sometimes even before they did so; and each battalion commander—for it is a peculiarity of this battle that the battalion commanders had generally to act independently—had to do the best he could with the companies he had with him. Now, what were the circumstances that prevented the battalions carrying the attack through in the same formation as that in which they advanced to the attack? Why had the initial formation to be modified and the ordinary peace practice to be departed from?

To make the matter as simple as possible, we will suppose that the German battalions had each of them eight companies. On referring to the regimental histories, it appears that out of thirty-two battalions no less than five arrived on the battle-field minus two and in one case minus four companies, and that eight lost from one to four companies while they were advancing, the missing units being employed to secure the flanks or to reinforce suddenly threatened points.

Moreover, not only battalions but brigades had often to be broken up into bodies of constantly varying strength. In five instances, two battalions worked together; in one, four battalions; in another, five battalions; in two instances, one-and-a-quarter battalion; and in another one-and-a-half battalion.

In each of these cases, therefore, every single commander had to handle a force which must have differed materially in strength and composition from that which he had been accustomed to handle in peace; and in eight cases the initial formation was broken up by the abstraction of companies during the advance against the enemy's position.

In the second place, the front which each battalion was compelled to occupy differed very materially. Each battalion had to occupy a front of the same length as that occupied by the force it was attacking. At least this is the explanation which suggests itself of the fact that nearly every battalion which advanced independently, no matter on how narrow a front it was originally formed, had, sooner or later, and generally at a very early stage, to prolong that front to both right and left. It stands to reason that such should be the case. If it had neglected to occupy that portion of the enemy's force which overlapped its front, the battalion would have been exposed to oblique as well as direct fire, and to the danger of an enveloping counter-stroke.

Thirdly, no less than eight battalions were brought up to reinforce a firing line composed of troops that sometimes did not even belong to the same army corps. In order to beat counter-strokes or to maintain the advance, battalions had to be literally piled one on top of the other; and an intermingling of units took place which, under the circumstances, it was

absolutely impossible to avoid. Here, again, the initial formation had to be departed from, for the companies had to be shoved into gaps, or despatched to turn the enemy's flanks, as the circumstances of the moment required.

Fourthly, I come to the effect of the ground. Ground is always held to have a large share in modifying the initial formation during the progress of an attack, and this is strikingly illustrated by what took place at Spicheren. The area over which the Germans had to manœuvre was peculiar, being divided into two distinct portions of essentially different character. First of all, there was an absolutely open space, without cover and without obstacles. Beyond were thick woods. On the open ground the initial formations did not require much modification, except that companies had sometimes to be detached to guard the flanks, and that the initial front was often found inadequate; but, on the whole, the cohesion of the battalion was practically well maintained. On entering the woods, however, the formations which up to that point had proved adapted to the ground soon showed their inefficacy, and an entire loss of tactical unity took place. In the open the battalions advanced with wide distances between firing lines and supports and between first and second lines. In the woods the same formations were adhered to. Instead of closing up, the same distances were maintained; and as soon as the enemy was met with, the supports were often extended in rear of the firing line, although they could not have been visible to the enemy or exposed to effective fire. This neglect to adapt the formations to the ground, to modify them when they became no longer applicable, contributed towards creating the extraordinary confusion which has already been described. At the same time it is unfair to push criticism too far. Every soldier will realize the difficulty of storming the edge of a wood in one formation, and then immediately assuming another in order to carry the fight into the interior. Still the fact remains that the varying ground rendered modification of the initial formation necessary.

One objection which may possibly be brought forward I may here anticipate. Von Kamecke's precipitation, his neglect to reconnoitre, made Spicheren what is called an abnormal battle, very different to an engagement in which both sides have time to make preliminary arrangements and to devise a plan of action at their leisure. It may be argued, then, that all the difficulties in the way of methodical leading and all the confusion were the fault of a single individual, and are not likely, therefore, to occur again. But even if we grant that all generals are now infallible, such battles as Spicheren are always possible. Information may be wanting, and yet it may be absolutely necessary to attack; incorrect intelligence may be sent back, or the scouts may fail to discover some sudden movement in good time. Moreover, when fighting against a well-trained enemy, every commander has to act more or less on probabilities; and, although his skill and knowledge may enable him to anticipate all movements and to judge accurately the numbers brought against him, it will sometimes happen, as it did to Napoleon himself at the very height of his renown, in the campaign of 1806, that he will be deceived. And, more than all, when once a battle has begun, no general can predict the exact course it is going to take. The unexpected is

always happening, and if officers are not trained to deal with sudden emergencies, to handle their troops in all sorts of situations and in all sorts of formations, and to act, when necessary, on their own judgment, even the most careful preliminary arrangements will avail but little.

As to the tactical leading on the part of the German regimental officers, it appears that the individual companies were well handled, but that they were careless of maintaining connection with the rest of the battalion. At the same time, the management of many of the battalions seems to point to inexperience and want of practice on the part of their commander. Von Hoenig, one of the ablest of German military writers, has lately made a statement which at once explains this difference in tactical capacity which existed between the company leaders and the battalion commanders of 1870. "We have learned," he says, "to work by companies and by brigades, but not by battalions." Unfortunately, the first battle of the war had to be fought out by the battalion commanders, and the importance of battalion leading became prominent when it was too late to teach it.

The Germans do not seem to have realized that battalion leading is far superior in importance to company leading, and ten times more difficult. A company is a small matter, and it is very seldom called upon to act otherwise than as a single body, or as firing line and support.

But with a battalion it is very different. Eight units can be disposed in many different formations; and as circumstances vary in almost every single engagement, the variety of formations that might be necessary on service is almost endless. I have already pointed out that, at Spicheren, the abstraction of one or more companies, the varying strength of the attacking columns, the varying extent of front to be covered, made formations in accordance with exact rule impracticable; and there can be no doubt that to handle a varying number of units on a different length of front every time he goes into action makes the battalion leader's work as difficult as it is responsible. From what occurred at Spicheren and at other great battles where breech-loaders have been employed, it seems that his task resembles, on a small scale, that of a general commanding an army; that the companies which form a battalion have to be handled and manœuvred in the same way as the brigades, divisions, and army corps which form an army; and that it is as impracticable for a battalion commander to decide before he goes on service the exact formation which he will employ in action, as it is for the commander-in-chief of an army, before he reconnoitres the enemy's position and learns his strength, to detail the exact task to be carried out and the exact position to be occupied by each one of his army corps or divisions. The preliminary arrangements are simple. The formation in three different "Treffen," as the Germans call them, a less ambiguous expression than the English "line" as applied to attack formations, forms a sound and judicious foundation for further operations. But when the contact with the enemy is made, the initial formation, as the Germans found at Spicheren, is liable to material modification at every turn. Battalion leaders should, therefore, be accustomed to handle their companies in constantly varying formations, with a constantly varying front, and to manœuvre them as a general manœuvres his divisions or brigades.

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They should be accustomed to take several companies, and to assign to each of them its own task, front, and objective, and at the same time to take such precautions as will tend to preserve tactical unity. So long as the battalion leader can retain his whole command, concerted action, and therefore strong action, is insured.

But important as battalion leading is, the training of company leaders must not be overlooked. It would be as impossible for a battalion commander to initiate sudden changes of formation under fire with eight unwieldy companies as for a brigadier to manœuvre rapidly with four unwieldy battalions.

The first step, then, towards a successful prosecution of the attack, is that companies should be thoroughly well trained within themselves. accustomed to constant change of formation, and to work on constantly varying fronts. If they have thoroughly efficient leaders, the battalion commander can go into action with the full confidence that, no matter how difficult the situation, his companies will respond to his orders with alacrity and precision.

In 1870, the companies had been trained to this pitch; but the battalion commanders had not been practised in using the highly tempered weapons thus offered them.

And company leaders must be trained to act on their own responsibility. Not only does the manner in which formations must be modified in order to suit the ground rest mainly on them, but in all ordinary offensive actions, a time must come when orders can no longer reach them.

If they have been trained to assume responsibility when necessary, the battalion commander can go into action with the full confidence that, when he himself can no longer guide them, they will carry out the object he has in view (if it has been made clear to them) with judgment and discretion. But to practise the battalion attack with raw company leaders and half-instructed men is merely to waste time. In peace or war, and especially in offensive tactics, the efficiency of the individual companies is the basis of success.

To sum up the lessons which may be deduced from Spicheren as to offensive tactics:

1. The necessity of careful preliminary arrangements.

2. The importance of preserving the tactical unity of the battalion.

3. The advantages of drawing up the troops for a decisive assault in great depth, *i. e.*, not merely strengthening the second line, but increasing the number of lines opposite the point where you intend to make your breach in the enemy's position.

4. The certainty that, in the attack on a well-posted and well-trained enemy, battalion will have to be piled upon battalion in order to maintain the advance or to beat back counter-strokes.

5. The necessity of training battalions to attack, not in stereotyped formations, but in formations adapted to the strength of the force the commander has at his disposal, the front he has to occupy, and the task assigned to him, whether that task be a decisive attack or a demonstrative attack, or the reinforcement of a firing line composed of other troops.

6. The necessity of training officers to act on their judgment, looking at the needs of the situation and not merely recalling hard-and-fast rules; to think, first of all, "What should I do to beat the enemy?" and not till that is decided on, "How shall I form my men?" "Experienced or not, capable or otherwise, they will have in battle to face that most difficult of problems, 'What is to be done?' a problem which demands imperiously our immediate solution, and which, well or ill, they must solve for themselves."* No text-book will help them, and as it appears from Spicheren, no normal formation will carry them through. At the same time, the initial formation in three lines, whenever troops are acting independently, with a screen in front, is a secure foundation for action, although it may have to be modified at every step.

Since the appearance of the "Provisional" drill-book of 1892, and the disappearance of all normal formation for attack, except the initial disposition in three lines, a certain amount of dissatisfaction with the new departure has found expression. There are those who seem to think that English officers are incapable of working under the new system which the Germans first introduced, and which is founded on the actual experience of the battlefield. It has been said significantly that, although this system may be applicable to the German army, "all officers are not embryo Napoleons!" It is not quite clear, however, why English officers are not just as likely to be "embryo Napoleons" as the Germans; nor, with the practical training they now have, why they cannot be just as well trusted—to say the least—to act for themselves according to the circumstances that present themselves in action. It is after all a question of sound judgment, of seeing quickly "what to do," and of applying common-sense and knowledge based on practice to a very difficult business. Of course, officers have to think for themselves, and to exercise their own judgment; but it is in these very qualities that English officers—at least, if the opinions of our own generals, from the Duke of Wellington to the present, are of any weight—peculiarly excel.

Moreover, our own battalion system—where, although the captains have definite responsibility, they are not, as in Germany, practically independent commanders, and where the habit of thinking of the battalion is everything—has in it an element of unity which was wanting in 1870. This element is exactly what is necessary to counteract that tendency to break loose from control and to forget the bonds of unity and subordination which some appear to apprehend will be the outcome of the new teaching. Our small companies, too, little more than one-third the strength of the Germans, have not sufficient strength in themselves to tempt officers to independent enterprises.

No doubt it would be far simpler to move to the attack in two deep lines, shoulder to shoulder, as our predecessors did in the days before the breechloaders. No doubt it would be simpler by far to lay down a normal formation, and to practise nothing else. But when we turn to military history, and fail to discover a single battle in which the initial formations of the infantry have not had to be very greatly modified, we may be permitted to believe that a system which accustoms officers and men to constant modifi-

* General Dragomiroff.

cations of formation, compels them to use their own judgment, and brings peace-training and battle-practice into line, is a thoroughly sound one. Moreover, if the experience of war proves that this system is essential, the sooner officers are educated up to it the better. Difficulty there may be in its application. But in war, and in things pertaining to war, difficulties are the rule and not the exception. Neither war nor training for war will be successful if difficulties are shirked.

As the system has been established for good and all, to thus discuss at length the reasons that dictated its adoption may appear like flogging a dead horse. But those reasons are not clear to every one; nor have all either the leisure or inclination to turn to military history—that is, to the experience of others—and find out for themselves whether the new departure is justified or not by the actual occurences of the battle-field.

MOUNTED PATROLS.

From The Saturday Review.

ONE of the greatest difficulties a commander has to encounter in these days of extended formations and long ranges is to preserve control over the various items of his force. Formerly men were able to do a great deal by word of mouth and gesture, and remained mounted within a few yards of the muskets that were pouring destruction on the enemy. Breech-loaders and magazine rifles have changed all that now, and if a colonel or brigadier attempted in these days personally to direct his force, moving amongst the companies and exposing himself after the fashion of a Picton or a Duke of Wellington, his abilities would quickly be lost to his side. Yet, unless his body as well as his eye is everywhere, it is not easy to correct errors, or give instructions perhaps rendered necessary by some fresh development of the fight. On our field days and manœuvres, leaders even of large units may frequently be seen as much *en évidence* under fire as that heroic divisional general at the Alma who rode in front of the first skirmishers of his command. Over and over again umpires have to rule even the most scientific soldiers out of action for this fault. The most advanced men, indeed, when in action often carry out their convictions more literally than any others, and even last autumn generals commanding divisions were on occasions discovered emulating the example set them in the Crimea. The bullets of the foe would, no doubt, in war be more deterrent than the decisions of the Umpire Staff; but then there would be no chance of profiting by the lesson taught, and a dead leader is often not easily replaced, nor could the machinery which would be needed as a substitute for voice or gesture be easily improvised on the field. Men who know better probably expose themselves now because it is only by doing so that they can bring their schemes to a successful issue, and because they will be less blamed by their comrades for being too forward than for being defeated. The difficulty has been felt in all countries and in all armies. In Austria some few years ago the subject was attracting much attention, and a distinguished officer wrote a little book advocat-

ing the addition of a few mounted orderlies to each infantry unit to act as scouts on the line of march, and as messengers during an engagement. These men were to be taken from battalions, and were, in fact, to be mounted infantry men, in contradistinction to cavalry soldiers. The Austrian is an essentially conservative army, and the scheme appeared too bold an innovation to find unalloyed favor in its ranks. Even the most obstinate were, however, obliged to admit that there was much justice and force in the arguments Colonel Regenspursky put forward, and eventually, as is usual in such cases, a compromise was agreed upon, according to which it was decided to permanently attach a certain number of troopers from the divisional cavalry to regiments and brigades of infantry on mobilization, who were to be at the disposal of the officers commanding these bodies.

In Germany a similar arrangement has been made. Like most compromises, however, these schemes meet with a scant amount of appreciation. The cavalry grudge the absence of a large proportion of effective sabres from their ranks, and, when their numbers have been thinned by the casualties which are inevitable even at manœuvres, can scarcely meet the drain. The infantry commanders are enjoined to send back to their squadrons the men lent them as soon as possible, and the troopers are impatient for the moment when they may return to what *esprit de corps* prompts them to regard as their proper work. Moreover, unless exceptionally intelligent men are deputed for the duty, who ride well, and are excellently mounted, scouting and the delivery of messages are neither so thoroughly nor expeditiously performed as is desirable. Now it is not in human nature for a squadron leader to deprive himself of his most valuable men and horses at the moment of need, and he can scarcely be blamed if he gives ungenerously at such a moment. In short, both officers and men of the *arme blanche* regard the new duties in the light of an exaction somewhat unfairly demanded of them; they enter on them sulkily, and quit them with a sigh of relief. Nor are they put in a better humor when the usual complaints as to insufficient education and imperfect performances are sent forward at the close of the day. Recognizing these difficulties, regulations are issued providing that the demand for men from the cavalry shall be kept as low as is possible. But who shall decide beforehand as to the minimum that the exigencies of a battle-field may call for; and, if numbers be limited, are not the men and horses selected in danger of being overworked? A German writer has recently stated that six cavalrymen will in future be needed by every regiment of infantry in a German division. That would mean that twenty-four sabres would be permanently withdrawn from the cavalry of that unit, and that too, be it noted, in addition to those who would be sent away by the general in command on all the multifarious duties that have to be provided for. Not unnaturally does the cavalry leader recoil in dismay from such an exaction, and declare with justice that he cannot hope to effect anything tactically with the mere handful which will then be left him. If the tactical application of divisional cavalry is no longer to be considered, why, will he ask, have they been armed with lances of late? Scouting will be better done without spears and pennons, and messengers are all the better without this picturesque equipment.

Every soldier must sympathize with these contentions; but, in truth, there is even more solid ground for opposition than they supply. It is not probable that any squadron will be able to furnish a sufficient number of men whose intelligence and physical qualifications are equal to the duties they will have to undertake. And there is no doubt that the demand for mounted messengers in the infantry is a very real one. The experiences of the Franco-German War showed that even twenty-four years ago—at any rate, at the beginning of the war—every officer placed in higher command felt the need for men to act as scouts, and to carry and bring information and orders. The want of a special mounted service also unmistakably asserted itself on the lines of communication, and when parties were detached. Not only that, but had the French cavalry acted with the intelligence and enterprise which are to be expected from the arm, the want would have been far more obvious than it was. Smokeless powder and a small-bore rifle have very widely altered conditions since the great German victories, and it is not an extravagant assertion that, if infantry must in the future have command of the assistance which mounted men supply, they must find the horsemen for themselves. But in order to be of much service as a messenger a man must ride something more than passably. He must have enough dash and skill to be able to gallop with decision and confidence over rough and broken ground. He may have to negotiate a small fence or two on his road, and he must certainly have his horse under the most perfect control. There are some such men to be found with every squadron; but not often more than a moderate proportion. And unless we turn riflemen into dragoons, it may safely be asserted that we could not expect to pick many such from amongst infantry battalions. A mounted infantryman is wisely taught to regard his horse simply as a means of locomotion, just as a cart or bicycle might be; if he be encouraged to a higher ambition, there lurks a danger that he will ape his comrade of the cavalry, and forget his rifle in a new zeal for spurs and whips. It is for these reasons that an idea has now been put forward in Germany that a special corps of orderlies should be organized and trained whose sole duty in war should be the rapid and intelligent carriage and delivery of messages and orders on the battle-field. We have not been unaccustomed in this country to seeing a few mounted military police at Aldershot turned to useful account at manœuvres—not, it is true, in the precise manner we have indicated, but still forming part of the staff of the chief umpire, and capable and ready to be of use in much the same way that a trained orderly might be. A strong squadron of such men would be quite sufficient for the needs of an army corps, and the addition of such a body would not seriously increase the expenses of our establishments. Nor would their training and education be a matter of great difficulty. The first point to be attended to would be to make them really good horsemen, and only men with some previous aptitude for horses would be selected. We should likewise have to look for something more than the average educational acquirements in our recruits. A man, to start with, should at least be able to write fairly, rapidly and legibly, and a little education ought to be sufficient to make him equal to a certain amount of map-reading, so that he might be able to turn a map or

sketch to useful account in a strange country. When he can ride, and has made some progress in simple topography, it will be necessary to take him on to study horse management, the fitting of saddles, and bridles, and to give him further practice with maps, and in the transcription of orders, or their verbal delivery. Quick, intelligent men would very soon pick up all that was required if placed in the hands of energetic and capable instructors, and practice on field days and at manœuvres would in a few months give the finishing touch. Men so trained might be distributed according as circumstances directed, but probably three would suffice for the needs of each commanding officer of a battalion, and two more might be placed at the disposal ot each brigadier. The general at the head of each division might be given four, and the remainder, if there were any unprovided for, might find employment on the staff of the commander of the army corps itself. Such a system as this appears to have a good deal to recommend it, although it is a far less ambitious one than is demanded by many who have thought out the subject deeply. It may not completely satisfy infantry officers who wish to see their brigades and battalions independent of extraneous assistance, and able to look after their own security against surprise. But there are sound objections to be raised against the conversion of even a small proportion of our riflemen into what would inevitably tend to become a species of bastard cavalry. On the other hand, leaders of regiments and squadrons will probably welcome an arrangement which will leave them their commands intact, and will free their men from an irksome duty, which is, and has always been, uncongenial to them. That smokeless powder and long ranges will compel us in some way or other to meet the altered conditions of warfare seems certain. We shall have to make a change somewhere, and the scheme we have been dealing with can scarcely be described as one so startling or drastic that we need view it with the apprehension or dismay novelties seem destined to exercise over a certain class of military minds. Neither need so small an increment to the organization of our *corps d'armée* disturb the quiet of the financier's mind. If the men have to be provided, it matters little whether we call them cavalry or messengers.

A GENERAL REVIEW OF EXISTING ARTILLERY.

A LECTURE PREPARED FOR THE INTERNATIONAL CONGRESS OF ENGINEERS AT CHICAGO.

By GASTON MOCH, Captain of Artillery.

Translated at the Military Information Division, War Department, A. G. O., Washington.

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DISTRIBUTION OF WEIGHT.

No less diversities of opinion exist regarding the proportionate weight of the gun carriage to the limber. Here we come upon two opposite ideas.

According to one, the piece should be accompanied with a sufficiency of ammunition to carry on a fight of considerable duration. If such were the case it is held the battery could be much more easily handled since it could be reduced to the guns and limbers when going into action, where it will be able to keep up its fire while awaiting the arrival of its caissons, which could come up in the most convenient manner. By this method the weight of the carriage proper would be reduced to nearly 40 per cent. of the harnessed piece, or about 640 kilograms in 1600.

According to the other idea, the supply on the limber is a reserve which should be drawn upon only when the caissons are absent or their contents have been exhausted; it can then be materially reduced in conformity with the supplies of those who use it as a normal instrument of combat. Under these conditions it is the piece and its carriage proper that represent the efficiency of the matériel, and they should comprise the greater part of the weight hauled; in other words, the total weight being given, the problem is to make it produce the greatest possible amount of living force.

This view is the one that has always been held in France, where the carriage proper weighs about 60 per cent. of the total weight of carriage and limber, while some French constructors have gone as far as 64 per cent. Henceforth I shall assume the carriage proper to weigh six-tenths of the whole, which will give it a weight of 960 kilograms.

The increase of power in relation to the inferior limit of 640 kilograms, given above, is enormous; and I will add, in order that I may not need to return to this point, that the remaining weight which may be utilized for ammunition is by no means to be disregarded. The limbers at present in use carry but 30 per cent. of their weight of projectiles. This proportion would still give us 213 kilograms of projectiles, which does not deviate greatly from the weights generally accepted in Europe. It admits, however, of great improvement, provided the dead weight of the carriages be reduced to a minimum by rational construction. The caisson lately built by Gen. Engelhardt for the Russian field mortar is divided into two carriages of equal capacity, each of which carries 50 per cent. of its own weight. There is, therefore, no reason why a limber weighing 640 kilograms should not carry at least 300 kilograms.

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77. As soon as the weight of the mounted piece has been fixed upon, all that remains to be done is to divide this weight between the gun and its carriage. This goes outside of the province of tactics (*i. e.*, of more or less subjective interpretations), to enter that of mechanics (*i. e.*, of calculations), with the unfortunate result, however, of arriving at a misconception.

The science of the construction of carriages is not as advanced as that of the construction of guns. The working of the different parts of these latter is so well known that we are able to calculate accurately what results it is proper to require of them. If it be merely required to obtain the idea of the living force that can be developed by a gun of a given weight, we have for this purpose the idea of efficiency, which is a numerical coefficient sufficiently determined at a given time without the necessity of specifying the conditions of the loading of the piece.

In order to be able to apply an analogous method to the preliminary design of a carriage, it is necessary to be guided by an experimental coefficient of the same nature. For instance, let the weight of the carriage proper be an already determined function of the weight of the gun as well as of the developed energy—that is to say, the efficiency of the gun. But, as I have already remarked, the efficiency of a gun does not depend on the conditions of loading; in other words, it is a matter of indifference, so far as the resistance is concerned, whether a given living force be produced by a somewhat heavier projectile impelled by a less velocity, or *vice versa*. Unfortunately this does not hold good for the carriage, since the strain sustained by it depends, in a manner but little known, on the weight of the projectile and that of the charge. At all events, the most plausible approximations known are those established in functions of these terms.*

If we attempt to proceed entirely by theory we get within a vicious circle, for in order to proceed farther and calculate the weight of the gun it is necessary to know the elements of the charge, which have not as yet been determined. All that can be done is to consider a rate of shock which shall not depart too much from existing guns, and to determine in consequence the weight of the carriage, leaving for future verification to determine if this rate, combined with a good efficiency of the gun itself, leads to proper conditions of loading.

We should not, however, make much progress toward a solution if we were to assume this rate without investigation, as a small variation of this

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* To facilitate the work, and because it is a matter of rather vague approximation, I take for the force of the recoil of the gun E, the old Piobert formula :

$$E=\frac{\left(p+\frac{w}{2}\right)^2V^2}{2gP}$$

in which P, p, and w denote respectively the weights of the piece, the projectile, and the charge, and V the initial velocity. I have already shown (Notes on the Field Gun of the Future, section 80) that it can be put in a more handy and more general form by showing the efficiency R of the gun and the ratio n of the weight of the charge to that of the projectile, which gives the following formula :

$$E=Rp\,(1+an)^2$$

in which a is a coefficient included between 0 and 1, and which may be taken as equal to 0.5, as Piobert did, without obtaining in the result an error greater than 10 per cent.

coefficient would produce a serious difference in the result, and we should consequently be forced to an undesirable amount of experimental calculations.

We are therefore compelled to proceed in an inverse and empiric manner by assuming for the gun and its carriage arbitrary weights to be modified afterwards should an exaggerated total be the result; as, for instance, if we assume that the piece itself weighs 45 per cent. of the combined weight of the piece and its carriage, as is the case in the French gun model 1880.

78. To sum up, the question of weight could be regulated according to this gun. It is very mobile when harnessed, and is one of those in which the greatest weight is given to the force of the gun and the carriage proper, and yet the latter is light enough to allow of its being readily man-handled or moved by applied force, even on rough ground.

By this means we obtain in round numbers the following weights:

Harnessed piece, 1600 kilograms (or 1950 kilograms, including a detachment of five men of 70 kilograms each), of which 60 per cent. is estimated for the combined weight of the gun and its carriage. Limber, 640 kilograms. Piece and carriage, 960 kilograms, of which 45 per cent. is for the gun itself. Carriage proper, 530 kilograms. Piece, 430 kilograms.

It is sufficient to consider the liability to error connected with the determination of these figures, in order to understand that they are mere approximations intended to serve as a basis for the study of a design, and are not given as the result of such a study.

Moreover this data represents a maximum which has been determined by supposing that the guns are drawn by six horses and that they require the greatest effort on the part of the horses that could be considered prudent to expect of them.

In the course of this work it will be seen that by utilizing these weights in the best manner compatible with modern industry we obtain so great a ballistic force that we may well ask whether it does not exceed the requirements of actual warfare, and if real progress does lie along on other lines. Personally, I am rather inclined towards the latter opinion.

TOTAL LIVING FORCE.

79. As soon as a positive weight for the piece has been determined, the total living force it is capable of giving out will be definitely known, provided always that it is constructed from certain materials and on a given system.

The efficiency of the steel field-guns adopted by different powers in the course of the ten years following the Franco-German War does not deviate much from 150 kilogrammetres. The highest is that of the French gun model 1880 (163 kilogrammetres). This amount has since been considerably exceeded. The following is a list of the latest guns that have been adopted or officially tried:

	Kilogrammetres.
Spain, Sotomayor model 1880	242
England, 12-pounder model 1884	224
3.2-inch gun model 1884	217
United States, 3.6-inch gun model 1891	186
Spain, Sotomayor model 1891 (under trial)	275

Private enterprise has also entered the lists, and the Gruson gun, calibre 8 centimetres, of 30 calibre length, gives 267 kilogrammetres per kilogram. Therefore 300 kilogrammetres has been very reasonably fixed as the limit for the efficiency of field-guns constructed according to present methods —that is to say, a tube reinforced by a jacket or hoops of steel.

It would be possible to exceed this figure if it were decided to jacket field guns with steel wire. I have already shown * that the efficiency can easily exceed 400 metre kilograms in a gun of the same weight and efficiency as the French gun model 1880, without making the maximum pressure rise above 3000 atmospheres, which are rather moderate figures for a wire-wound gun. It is unnecessary to introduce this calculation here, since, as far as I know, it has met with no contradiction. Again, it must be borne in mind that the conditions I chose in order to give a more striking example were fraught with disadvantages, because I adhered to a design ntended for a less violent fire. As a matter of fact, this considerable increase of living force would involve an increase of velocity and spherical density—that is to say, a reduction of calibre, which would result in a relative lengthening of the gun.

It would, therefore, not be extravagant to allow, for a field-gun wound with steel wire, an efficiency of 350 kilogrammetres, a figure which we shall discuss later on, and which, if the gun weighs 430 kilograms, will furnish an initial living force of 150 metre tons. It must be understood, however, that I make all reserves as to any utility there may be in carrying the living force of the field-gun to more than double the actual current value. By this I mean merely that if it be judged necessary to indefinitely increase this living force, it will be very easy to require 150 metre tons of a gun weighing 430 kilograms; indeed, I should not hesitate to attempt to go as far as 170 metre tons.

PROJECTILES IN GENERAL.

80. The weight of the gun, and consequently the living force that it gives to a projectile, being known, all other data should be susceptible of mathematical deduction; for it is very evident that, when this initial living force has been obtained, there will be a certain combination of weight, velocity, and calibre for the projectile which will be preferable to all others. It is needless to say that so direct a solution of the problem is nothing short of a dream, and the more so because not only should the projectile sought for possess good ballistic qualities, but the manner in which it breaks up is perhaps a still more important factor of its effectiveness.

We are thus more than ever compelled to proceed by induction, feeling our way as we go, and eventually attaining knowledge by experience, which, after all, is the only true criterion.

The entire design of the piece depends upon the combination of weight, velocity, and calibre that it has been decided to give the projectile. These three elements are so intimately connected that whenever one of them has been determined the others are necessarily included within narrow limits, which permit of but slight variation.

The weight of the projectile is evidently the element which we should

* See "Notes on the Field Gun of the Future."

use as a starting point, since it is the only one for which firing practice furnishes tolerably definite limits. The superior of these limits results from the minimum number of rounds with which we propose to supply the battery; the inferior, from the complicated arrangement we are forced to give to the interior of the projectiles.

81. Before going any further it is indispensable to decide upon the nature and weight of the projectiles we intend to use.

Their nature is a question of experimental tactics, and may possibly seem to have nothing to do with a simple duty of the construction of matériel. It is, however, impossible to pass it over in silence, because it serves as the basis for all discussion on the subject.

This does not mean, however, that tactical considerations are paramount, for they must often give way to necessities resulting from the present state of manufactures.

Moreover, I have already pointed out that field tactics depend not only upon the knowledge of the material, but also on that of the moral effects of the armament. And consequently it leads, not, like an exact science, to a precise determination of the end to be sought, but simply to the indication of two limits between which this end is situated; and these limits may be widely separated.

Thus certain authors, few in number it is true, extoll the use of very heavy projectiles, even as high as 12 kilograms. We will say nothing more of this school, which has clung to principles that have been by this time abandoned by all artillerists.

At the other end of the scale we find a view, based on the violence of modern explosives, which favors percussion fire of very small shattering shells—of, for example, 1 kilogram—launched in a continuous stream, or, as it is called, by "*rafales*" (sudden gusts).

It is possible that in this way very important results may be obtained, although it is difficult to accustom one's self to the idea of abandoning fuse fire, against troops at least; still, no one is yet in a position to affirm this, for in order to do so it would be necessary to argue from actual tests, and these are not yet ready to be made. The construction of such a matériel presupposes the solution of momentous difficulties, some of which do not appear to be immediately solvable. For instance:

First. These projectiles would rapidly lose their velocity; still, this objection can be obviated by increased length, since we are treating of shells, which can be lengthened more than shrapnel.

Second. Their lightness would have to be compensated for by rapidity of fire, which their promoter himself estimates as 50 rounds per piece per minute.

Third. The weight and the volume of the detonator has thus far been nearly independent of calibre; and if the weight of the envelope be taken into account, the result will be that no room is left for the interior charge.

Fourth. There is at present no means of seeing, even at middle distances, the explosion of such small projectiles.

To sum up, the weight of 12 kilograms goes back to an idea of the past which does not seem likely to be resuscitated: and as to that of 1 kilo-

gram, if it has anything to hope for in the future, that future appears to be very distant.

I have considered these extreme values precisely because their exaggeration is self-evident and because it is apparent that the weights to be considered must lie between them. I also have no hesitation in saying that, fortunately, the choice may still be more narrowly circumscribed. In so large a field there exists a number of weights, each susceptible of defense on tactical grounds, and each practically unrealizable; especially if, as I believe, the use of shrapnel continues to be required.

82. The time has passed when cannon balls act solely by virtue of their total mass and remaining velocity, as is still the case in high-power (armor-piercing) projectiles and rifle bullets. Even the earlier classes of segment shell are now out of date. Only two great classes of projectiles for field-guns are now recognized, viz., shrapnel and explosive shell. The latter are divisible into the two sub-classes described in section 53—shattering shell and torpedo shells.

Whatever ideas may be entertained regarding the use of these projectiles and their distribution in the supplies, all artillery systems have admitted that they should be of the same weight, or at least that care should be taken that the variation of weight be but slight, compensating effectively for the differences of their exterior shape, so that in action they could be used indiscriminately without requiring a new elevation for the gun.

It is in reference to the requirements of shrapnel that these weights should be established, because shrapnel already is, and appears likely to remain for a long time, the projectile best suited for use against troops. In other words, it is the projectile *par excellence* for the field of battle, other projectiles being mere accessories in the field equipment; and there is little probability that there will be any difference in the future. However, it may be well here to say a few words on explosive shells, which may possibly furnish some interesting data.

The shattering shell and the torpedo shell represent, in different armies, the results of directly opposite opinions regarding the use of explosives.

The torpedo shell is designed to supply the deficiencies of shrapnel when employed against material obstacles; its mission is to carry the greatest possible quantity of explosive, while that of the shrapnel is to carry the greatest possible number of balls. It is, in a word, a mass of explosive filling a thin receptacle, and its action should be that of a mine, and not the projection of a mass of fragments.

Quite on the contrary, the shattering shell contains a comparatively small bursting charge, and acts only by its fragments, and it may be constructed so as to break up regularly or not. In reality it is but an ordinary shell, whose fragments are projected with much greater force than was possible when black powder was used. It is prepared especially for fuse fire and for use against troops behind shelter, and its bursting charge is arranged so as to give a wide spread to the fragments. It may be objected to on account of requiring great delicacy in handling, its almost vertical action demanding great precision of elevation. This, however, is not the

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place to discuss questions of firing practice, the task in hand being to furnish a precise definition of these various projectiles.

Now, it is evident from this definition of the torpedo shell that it does not admit of a reduction of calibre. Its effects are proportionate to the quantity of explosive that it contains, and the rapidity of the succession of rounds fired does not compensate for the failure of an isolated one, because different projectiles will hardly ever strike in the same place. The expression "shells of great capacity," so frequently employed, is a capital definition for the requirements of this projectile, for it is well known that the capacity decreases more rapidly than the calibre. Thus, if an 8-kilogram shell contains 1400 grams of explosive a 5-kilogram shell will perhaps contain no more than 700 grams.

The latter would, however, constitute a very respectable charge. Nevertheless, this diminution would go far toward compelling the adoption of howitzers or field mortars, whose use would be limited to the firing of torpedo shells against the principal obstacles.

83. The shattering shell presents no difficulties of this nature. As a matter of fact it belongs to the class of shell properly so called, that is to say, projectiles whose purpose is to shower on an animated object a quantity of small fragments. It is, therefore, readily seen that the augmentation of the number of rounds fired can compensate for the decrease of projectile itself, as soon as the weight and remaining velocity of the fragments are sufficient.

Experience furnishes us with the following laws relative to these projectiles, according to Col. Langlois:*

"In any system of artillery, at a range where two projectiles of different calibres possess the same remaining velocity, and at inferior ranges, a light projectile produces an effect relatively greater in proportion to its weight. Beyond these ranges, by reason of the more rapid decrease of its velocity, this superiority is gradually lost. There is a range at which the effects of both calibres are exactly proportional to the weight. For brevity of expression we will call this the range of proportional effects. The law may then be expressed in the following terms: The range of proportional effects is always greater than the range of equality of remaining velocities."

As a matter of fact, in all artillery systems which have retained field-guns of two different calibres, the range of proportional effects is very superior at combat distances; from which it follows that for the distances to be considered in practice it is the smallest projectile which produces the greatest effect for a given weight of ammunition consumed.

84. This experimental law applies to all other artillery projectiles excepting torpedo shells—that is to say, to all those that act by the projection of their fragments. It must, however, be borne in mind that it has been verified only by the fire of the present regulation field-pieces—that is to say, between very narrow limits, which in round numbers are 8 and 9 centimetres. It would no longer be found to apply, if we were to consider extremely dissimilar calibres.

The reason for this is that every projectile involves a dead weight

* "Field Artillery in Connection with the other Arms." Paris: Baudoin, 1892.

which decreases at a less ratio than the calibre. Most commonly this weight includes the fuse, which does not break up, and the base of the shell, which breaks up but little and badly, if of cast iron, and if of steel does not break up at all. No matter how carefully a small projectile be constructed with a view to breaking up, the number of fragments necessary and sufficient to put a man *hors de combat* must be relatively smaller than those of a larger one. If the difference be slight, this defect of the small calibre will be amply compensated for by its advantages; if we go too far in this direction the defect will outweigh the advantages.

THE SHRAPNEL.

85. The foregoing is precisely the case with the shrapnel. It is in this projectile that the accessory organs which constitute the dead weight from the point of view of the effects of fire, assume the greatest importance; and it is in this that the difficulties of its interior construction will clash the soonest with the inferior admissible limit of calibre.

Immediately after the war of 1870 an effort was made to obviate the defects of the common shell by so disposing the interior as to secure its breaking up into a regular number of pieces (shells containing segments, shells containing balls, and double-walled shells). At the same time the use of shrapnel was developed, which, in its inception, was nothing else than an ordinary shell filled with balls.

But the shrapnel assumed a considerable superiority as soon as its manufacture in steel was commenced. Segment shell of cast iron were definitely set aside as soon as it became possible to construct an envelope sufficiently strong to permit the body of the projectile to be reduced to a minimum. It is evident that this progress enabled the shrapnel to become the best of segment shells, as it is simply a package of balls (that is to say, theoretic fragments) contained in an envelope of so slight relative weight that it may practically be disregarded.

In this manner bullets have become, properly speaking, the real field-gun projectiles, and it is their effect that determines the ballistic qualities that the gun should possess. They should retain at their extreme ranges sufficient living force to put a man *hors de combat*. This consideration, taken in connection with the necessity for the balls to be sufficient in number (that is to say, not too large), is one of the principal factors for determining the velocity necessary for the projectile. It should be noted that as the shrapnel is intended for fuse fire it is on striking the ground, and not bursting, that the balls should possess their energy, as the distance they have to go after their separation is considerable enough to involve notable loss of velocity.

86. In point of fact, the modern shrapnel is to the old shell of regular fracture, or that filled with balls, what the torpedo shell is to the common or shattering shell. The walls, the base, the fuse, the bursting charge, the cavity or grenade which contains this latter, as well as the central tube (when it existed) for the ignition of the charge, should be considered as dead weight. I do not speak of the substance, sulphur, resin, or plaster of Paris intended to cement the balls, as I suppose that this primitive device is des-

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tined to be replaced generally by the use of built-up segmental disks which define the type of shrapnel shell.*

The intrinsic value of the projectile is measured by its interior efficiency—that is to say, the relation of the weights of the balls it contains to its total weight.

The dead weight above defined may be divided, according to Col. Langlois, into two very distinct parts, one of which is a function of the calibre and the other is independent of it.

The first is naturally less embarrassing, and includes in a shrapnel shell the envelope, the base, and the ring, which decreases with the calibre, without, however, being absolutely proportional to it.

What is more, serious, however, is the dead weight formed by the bursting charge, the cavity or grenade, and the fuse. The charge is determined by the condition of furnishing a visibly distinct cloud; with black powder it cannot be less than 100 grams if the shrapnel is to be utilized to regulate the range; in its turn it regulates the volume of the chamber, for which we count on a weight of about 1.2 kilograms. As to brass compound fuses, they do not weigh less than 400 grams. This gives a total constant dead weight of 1.7 kilograms.

Under these conditions the efficiency of the projectile decreases rapidly with its weight. A shrapnel of 4 kilograms would not contain more than 1.2 kilograms of balls, which would give an efficiency much too weak, 30 per cent.; a shrapnel of 1.7 kilograms would be reduced to the cavity and the fuse alone, in other words, it would cease to exist.

From this we have the following important conclusion, formulated by Col. Langlois:

"The limit of reduction of calibre depends principally upon the internal construction of the projectile.

"Suppose that to-morrow we discover a powder of such great density that a volume of, say, 20 to 25 cubic centimetres, instead of 100 cubic centimetres, will produce on bursting sufficient smoke for regulating the range, the grenade or powder chamber necessary to contain this charge would then weigh but 600 grams; and supposing that we succeed in making a fuse of 200 grams instead of 400, the constant dead weight of 1700 grams would thus be brought down to 900 grams (600+200+100 for the powder). The 4-kilogram shrapnel could then contain 2 kilograms of balls, and therefore become realizable."

To sum up, the discourse of the learned writer, supported by the effects of fire and the present means for the manufacture of shrapnels, ends by showing "that the maximum effect with the minimum ammunition" would be furnished by a steel shrapnel of 74-millimetre calibre, weighing 5 kilograms and containing 100 grams of black powder. This inferior limit of calibre would permit a good interior efficiency, and could, moreover, owing to progress in manufacturing, be ultimately lowered still further.

87. It must be noticed that this possibility seems assured from now on.

* The name ordinary shrapnel is here restricted to projectiles in which the balls are held together by means of an inert substance, and that of shrapnel shell to those projectiles which contain only segmentally divided disks.

There exists in the United States a compound fuse, made of aluminum, identical to the model of 1891, and consequently similar to our own. It weighs but 180 grams instead of 400. There is no reason why the grenade of a shrapnel shell should not also be made of aluminum, which wou d lower its weight to at least 500 grams instead of 1200 grams, at the same time retaining a volume sufficient to contain 100 grams of black powder.*

By these changes the 4-kilogram shrapnel mentioned in the foregoing paragraph could be realized with an interior efficiency of more than 55 per cent. of balls.

Other considerations will show us, however, that the inferior limit of 5 kilograms should not only not be lowered, but is already too low for a gun of great power, at least so long as shrapnel continues to be the principal ammunition for the field of battle.

POWER OF MOBILITY.

88. We have already seen that if we propose to construct a field-gun conforming to the conditions of the weight used up to the present time the least that can be required of it will be to furnish 150 metre tons of initial living force. If, then, the projectile weighs but 5 kilograms it should have an initial velocity of 767 metres.

Now, such a velocity goes 200 metres beyond the boldest propositions for field-guns. If, then, this is not to be an *ignus fatuus*, the projectile will have to possess a greater density than any of those that already exist. To make it effective it would be necessary to give it a density equal, at least, to that of the more recent rifle bullets. Without going so far, it will be noticed that the present greatest spherical density in artillery is 4.61, and is possessed by a projectile that has an initial velocity of but 530 metres. It may, therefore, be admitted that a density of 5 would be the minimum for an initial velocity of 767 metres. If the corresponding spherical bullet weighs but 1 kilogram, the calibre of a projectile of 5 kilograms falls to 65 millimetres, at which figure the internal construction of an effective shrapnel presents difficulties which thus far have not been overcome.

Supposing, however, that we do not make so great a reduction of calibre, but stop, for example, at 75 millimetres. Then the 5-kilogram projectile will weigh but 3.25 spherical bullets, a density which is used with a velocity of about 450 metres, and which would be manifestly insufficient with that of 767. It would then be necessary to augment but very slightly, if at all, the velocity of the projectile. In this case the efficiency of the piece would be much below what we have a right to expect at present. The interior efficiency of the projectile would have been improved at the expense of that of the carriage.

This latter is in practice the most interesting.

What the teams have to haul is not merely the ammunition, but also the carriages, whose weight includes that of the ammunition, which is not the least important part. In that case what would be the use of gaining a few

*The gain realized will be proportionately greater than for the fuse in which there will necessarily remain a number of very heavy parts, as the plunger, lead tube, etc.

hundredths in the efficiency of the projectiles, if by doing so a considerable portion of the piece be changed to dead weight? This will, nevertheless, be the result attained if we devote a weight of 1600 or 2000 kilograms to obtaining an energy approximating that of actually existing matériels.

89. To sum up, it appears that the weight of 5 kilograms is a proper one for shrapnel carried on the field of battle. It may even be said that the use of aluminum will henceforth allow of the construction of shrapnel weighing 4 kilograms, which will produce a greater effect with less total weight of ammunition consumed, or, at least, of the construction of a shrapnel weighing 5 kilograms still more effective than the above.

But if great power is sought, the weight of 5 kilograms is too small, since it involves too great a reduction of calibre.

If one is content with a medium power this weight is allowable. In that case there is no use in keeping the weight of the carriages as they now are, as a great part would be mere dead weight which should be got rid of. A gun constructed under these conditions would not be up with the times, and would be retrogression instead of progress.

(To be continued.)

DISCIPLINE ON THE PARADE-GROUND.

From the United Service Gazette.

IN these days of loose formations there is a great tendency to consider that the stricter forms of discipline are no longer absolutely necessary, even rather that they are a superfluity. We are glad, therefore, to find an officer not only insisting upon their importance, but also giving a well-reasoned argument, treated from a somewhat novel point of view, to prove the uses and effects of discipline.

Every single individual soldier is (Lieut. Stewart Murray, 1st battalion Gordon Highlanders, observes in a recent *brochure* *) an important item in the pell-mell of a modern European battle-field, upon whose conduct at a critical moment and the example he sets to his comrades around him, weighty results may depend.

In considering any question where human nature is concerned, it is necessary first to get a clear grasp of the ideal theory on which its reason is based; secondly, to make the necessary allowance for human nature; and thirdly to lay down the limit beyond which any further deviation from theory becomes detrimental, and which, therefore, must not be over-stepped.

In considering the subject of discipline on the parade-ground we must accordingly begin by stating the ideal theory thereof, so as to get to the bottom of the matter as much as possible.

Discipline aims at producing in every single individual the habit by which his very muscles instinctively obey the word of command. Instinctive obedience may be defined as the habit by which the brain, on receiving a

* "Discipline: its Reason and Battle Value." Gale & Polden, Limited, Aldershot and London.

command through the sensory nerve of hearing, instantly without any consideration or opposition, sends it along the motor nerves to the muscles.

The theoretical bases of instinctive obedience are as follows: The act of obedience to an order is divided into three periods: (1) The time taken by the nerve impulse travelling along the sensory nerve of hearing to the brain. (2) The central period or time taken by the brain considering the sensation and deciding what to do. (Thought.) (3) The time taken by the nerve impulse traversing the motor nerves from the brain to the muscles.

Of these (1) and (3) are measurable, while (2) is indefinite. The time taken by (1) and (3) is so small as to be practically of no account, yet to make the theory clear, it is as well to put it down. Nerve impulse travels along the sensory nerves at the rate of 140 feet a second, along the motor nerves at the rate 110 feet a second. Now the nerve of hearing is about four inches long, so it takes an order, travelling at the rate of 140 feet a second, only .0024 of a second to arrive at the brain. In a man 5 feet 10 inches high it takes an order, at the rate of 110 feet a second, .054 of a second to travel from his brain to his feet. Therefore, the total time taken by an order travelling along the sensory and motor nerves to the muscles is .0564 of a second, or, roughly, one-twentieth of a second. To this, however, must be added the indefinite central period. And here comes in the personal equation. The central period is longer than the other two; even in the instantaneous process of blinking the eye, it takes .0555 of a second. So the utmost possible rapidity with which an order to march can be carried out by a man 5 feet 10 inches high is:

Reaction Period.
(1) .0024 of a second.
(2) .0055 of a second.
(3) .054 of a second.

Total .1119, or a little more than one-tenth of a second.

Foster, in his book on Physiology, states: "Roughly speaking, reaction periods for auditory nerves may be put at one-sixth of a second." Also, "Practice materially shortens the reaction period, and after long practice the process takes on more of the character of a reflex (involuntary) act, with a corresponding shortening of the interval." For purposes of this theory, however, it is sufficient to take the rough average for the three periods together as one-sixth of a second; remembering that by constant practice the central period can be so shortened as to make the act almost instantaneous and involuntary.

When the soldier accordingly carries out an order to march or to turn one-sixth of a second after hearing the word of command, he is carrying it out with the utmost possible rapidity. Until he does so, he has not yet completely acquired the habit of instinctive obedience, as it is manifest that some delay or opposition must be taking place before his brain passes on the order to his muscles. Therefore, in order that the muscles may be perfectly trained in the habit of instinctive obedience, no time should be allowed between the word of command and its execution beyond the one-sixth of a second required for the order to pass from the soldier's ear through

his brain to his muscles. Such is the ideal theory of instinctive automatic obedience.

As, however, our material consists of a mass of men differing widely in character and capabilities, we cannot of course expect to obtain this instantaneous complete theoretical obedience. Nevertheless, it has been shown by experience that, after making all necessary allowance for the imperfection of our material, we can go very near towards attaining the desired result if the regulations of discipline are thoroughly and consistently carried out. This is the reason that it is laid down in the Infantry drill that "great precision is to be inculcated"; this is the reason that the greatest possible smartness in the execution of every command is insisted upon by strict discipline. It is insisted on, not because the motion will look better, as some appear to think, but because the idea which underlies all smartness in the execution of orders is to train the soldier to that habit of instantaneous instinctive obedience which may prove his salvation in the pell-mell of battle. Therefore, the greatest possible smartness and strictness at drill is most valuable as education in instinctive obedience, and is the best preparation for victory; on the other hand, slackness in discipline and drill does not educate the soldier's muscles to instinctive obedience, and can accordingly only be a preparation for defeat on a European battle-field.

If the subject be considered from this point of view, the necessity for the greatest possible smartness in the performance of every motion must be apparent to the intelligence of every non-commissioned officer and private soldier. Those who have thus grasped this necessity should explain it to their less intelligent comrades, so that every single individual soldier, without exception, may thoroughly understand it and try to carry it out on all occasions.

The chief muscles which can be thus trained are those of the legs, feet, and arms; or, in other words, the muscles of marching, turning, and handling the rifle. Therefore, in these three particulars, the greatest possible smartness should be insisted on as regards every single individual soldier without exception, always and everywhere. Those soldiers who at first are slow and awkward should be practised again and again till, in these three muscular movements, they have attained the same level of excellence as the rest of their comrades.

As an example of how the exact and perfect performance of these motions is an exercise in the habit of instinctive muscular obedience, let us take one of them and consider it in its relation to such exercise. Let us take for example the muscular movement in marching. There is, as every soldier knows, a great difference between marching at "Attention" and marching "At Ease." The former is intended partly as an exercise in muscular obedience, partly to train the muscles of the soldier's legs to endure fatigue, and to teach him to take pace of a proper length; while the latter is used when it is desired to get over the ground without fatiguing the marching muscles. Two different muscular movements are therefore used, according as the soldier is marching at "Attention" or "At Ease." When the soldier is marching at "Attention" he is meant to carry out the muscular movement which he has been previously taught by the "Balance

Step." On the word "Quick-March," "the left foot is to be carried smartly to the front, the knee being straightened as the foot is carried forward"; it is then to "be placed firmly on the ground, 30 inches distance from heel to heel." This is, undoubtedly, a constrained position; it is not the position in which a man naturally walks; but it is for this very reason that it is an exercise in constant muscular obedience of the legs, and in teaching the muscles to endure fatigue. This is one of the chief reasons that it is ordered in the Infantry drill. When it is required to march in an easy, unconstrained position, the soldier is allowed to march "At Ease" and to bend his knees.

Therefore, if the constrained attitude of marching at "Attention," keeping the knees straight, as ordered in the "Position in Marching," is properly carried out, the muscles of the soldier's leg, besides being developed, are constantly being exercised in instinctive obedience. In marching "At Ease" it is not then the object to train the muscles of the leg to obey the brain, but merely to get over the ground with the least fatigue possible to the marching muscles. This is the great difference between marching at "Attention" and marching "At Ease," and it must be understood and constantly borne in mind by all, otherwise the soldier cannot see why he should be required to march in a constrained position—"both knees to be kept straight" when at "Attention"—and will try to slur over the marching at "Attention," and march in the natural step of "At Ease"; that is to say, he will bend his knees.

Every officer, non-commissioned officer, and private soldier well knows that this is so; that the balance step is often not properly carried out in the quick march, and that, when marching at "Attention," the soldier is frequently allowed to bend his knees, which is proper only when marching "At Ease"—that is to say, on the order "Quick-March," exact and instantaneous obedience frequently is not insisted on; but by such loose discipline all the advantages of the carefully thought-out training of the soldier in instinctive muscular obedience is lost. The motion of marching at "Attention" (knee to be straightened as the foot is carried forward), is ordered for a particular purpose—that is to say, it is ordered so as to train the muscles of the soldier's leg in instinctive unquestioning obedience. If, however, the motion is not carried out exactly as ordered, if the soldier is allowed to bend his knee when the order says it is to be straightened, then this purpose cannot be achieved, and marching at "Attention" is made valueless as an exercise in unquestioning automatic obedience. The soldier, in fact, is then allowed to consider how much of the order it is necessary to obey, and to obey only half of it—whereas, the whole object of discipline is to train him in the habit of exact, unquestioning, instantaneous obedience to any word of command. Such slackness in marching at "Attention," therefore, not only fails to carry out the great object of discipline, but it works in exactly a contrary direction, by accustoming the soldier to only half obey an order.

A similar analysis of the motions of the muscles of the feet and arms, or, in other words, of the motions of turning and of handling the rifle, will convince every non-commissioned officer and private soldier why it is absolutely necessary that the greatest possible exactness and smartness must be in-

sisted on in the performance of these motions, regarded as exercises in instinctive instantaneous obedience of the muscles to an order received by the brain and thence passed on to the muscles.

Every soldier must further understand that the reason of this strict discipline on the parade-ground, this instruction in the habit of instantaneous instinctive obedience to the word of command, is not merely that the close-order drill may present a smart appearance, but that its object is to carry him victoriously through the utmost stress of modern battle; and that by this means only can he hope to fight successfully in that most difficult position of all, as part of a new unit hastily formed under a strange leader out of that mixture of old units which constitutes the pell-mell of a modern battle-field. In such a pell-mell his salvation will depend upon his discipline, upon his habit of instinctive obedience. That he may emerge victorious from such a desperate struggle, this is the object of his strict close-order drill on the parade-ground.

TURRETS IN THE FORTS ON THE LINE OF THE MEUSE.*

Translated by LIEUT. LANSING H. BEACH, CORPS OF ENGINEERS, U. S.

AS early as 1863 there was a turret in process of erection in the redoubt of Fort No. 3, at Antwerp; five years later, in 1868, three more turrets were built in Fort St. Phillippe, on the Scheldt; but not until considerably later did the other governments follow in the path first marked out by Belgium; and turrets came into general use only with the increasing skill in metallurgy and with the improvement in armor construction.

At present turrets have been erected:

In Germany; at Cologne, Metz, Bremerhaven, Hamm, Strasburg, Ingolstadt, Königsberg and Thorn.

In France; at Maubeuge, Toul, St. Denis, Belfort, Hirson, Montfacon, Versailles and other places.

In Holland; at Nieuve, Maasmund, Ymuiden and Harssens.

In Italy; at Allessandria, Spezia and Messina.

In England; at Dover.

In Switzerland; at Airolo and

In Roumania; at Bucharest, etc.

Belgium has made use of armor in the fortifications now approaching completion along the line of the Meuse in a manner that no other country has done, and she will also use similar armor construction in the newly built forts at Antwerp. It is also her intention to put turrets at some later period in the older forts of this latter place.

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* *Die Panzerthürme der Forts der Maas-Linie.* Zusammengestellt von Josef Fornasari Edler von Verce, k. und k. Hauptman des Geniestabes.—Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens. Third part, 1892.

In the fortifications of the Meuse the ideas of General Brialmont are carried out as he lays them down in his works, "L'Influence Du Tir Plongeant," and "Les Regions Fortifies."

The forts of the bridge heads at Liege and Namur have a triangular trace, the few exceptions being trapezoidal in plan.

Liege is surrounded by a line of 12 works which are as follows:

Upon the right bank of the Meuse.	Fort Barchon Fort Fleron Fort Boncelles	Large works.
	Evegnee Fort Chaudfontain Fort Embourg	Small works.
Upon the left bank of the Meuse.	Fort Flemelle Fort Loncin Fort Pontisse	Large works.
	Fort Hollogue Fort Lantin Fort Liers	Small works.

Namur has a line of nine works which are:

Upon the right bank of the Meuse.	Fort Andey	Large work.
	Fort Maizeret Fort Dave	Small works.
Upon the left bank of the Meuse.	Fort St. Heribert Fort Suarlee Fort Cognelee	Large works.
	Fort Malonne Fort Emine Fort Marchovleette	Small works.

Works of the same type have similar armaments. That of a large work consists of:

2 turrets for one 21 cm. howitzer.

1 turret for two 15 cm. guns.

2 turrets for two 12 cm. guns each, and

4 disappearing turrets for one Nordenfeldt rapid-fire gun each.

The armament of a small work is composed of

1 turret for one 21 cm. howitzer.

1 turret for two 15 cm. guns.

2 turrets for one 12 cm. gun each, and

3 or 4 disappearing turrets for one Nordenfeldt rapid-fire gun each, according as one or two such turrets are placed in the salient of the work.

Each work has in addition one disappearing armored search light platform, which can be used also as an observatory, or in case of necessity as an emplacement for a rapid-fire gun.

For the armament of the ten large and eleven small works above mentioned, the following named turrets are therefore needed, viz.:

31 turrets each for one 21 cm. howitzer.

21 turrets for two 15 cm. guns each.
20 turrets for two 12 cm. guns each.
22 turrets for one 12 cm. gun each,
77 disappearing turrets for one rapid-fire gun each, and
21 disappearing turrets for search light stands.

Each fort has also a number of rapid-fire guns mounted on wheeled carriages, which can be used on the ramparts or outside of the forts for firing upon points not reached from the turrets.

It is evident that for the furnishing of such a large amount of armor in a relatively short time, several of the already erected foreign establishments had to be called upon. In Belgium up to 1888 only cannon and other artillery material were manufactured, and only since that date have the Belgium iron works advanced to the point of armor production. In this new direction they have attained marked success, and were by direction of the government given an order for a large portion of the armor.

The following establishments took part in supplying the above mentioned turrets.*

The Cockerill Company of Seraing and the St. Chamond steel works.†

The Cockerill Company and Gruson's establishment.

The Meuse shops in Liege, Marcinelle-Couillet in Hainault and Chatillon-Commentry.

The Van de Kerckove Company of Ghent and Creusot.

The armored search light stands will be made in only the Meuse shops.

By direction of the Ministry of War no alterations were undertaken in the several types of turrets which had undergone the test of experience and whose details had been fixed in the various establishments, though some dispositions had to be made which mark a real progress in turret construction.

These arrangements in which the turrets along the Meuse differ from those of other States are:

1. The guns no longer project from the turret, and are therefore protected against direct hits, oblique fire and fragments of shells.

2. The embrasure is by means of a sleeve joint and elastic rings secured against the entrance of projectiles, fragments of shells and gases.

3. The pivot cylinders and the hydraulic mechanism which took away

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* From the Gruson works were ordered 21 turrets for 21 cm. howitzers, 9 turrets for two 15 cm. guns and 63 disappearing turrets for Nordenfeldt r. f. guns.

From St. Chamond 4 turrets for two 15 cm. guns, and turrets for 12 cm. guns.

From Creusot 8 turrets for two 15 cm. guns.

From Chatillon-Commentry turrets for 12 cm. guns.

† The contracts for furnishing the Bucharest turrets were by direction of the Roumanian government given to the various French firms as follows:

To St. Chamond at about seven million francs, 10 turrets for two and 18 turrets for one 15 cm. gun.

To Chatillon-Commentry at about seven million francs, 10 turrets for two 15 cm. guns and 26 cupolas for 21 cm. howitzers.

To Creusot at about nine million francs, 14 turrets for two 15 cm. guns, 126 disappearing turrets and 398 casemate carriages for one 57 mm. r. f. gun.

The Hotchkiss Company furnishes 126 r. f. guns, 57 mm. calibre. The further orders for 398 57 mm. r. f. guns, for turrets for 21 cm. howitzers and for armored illuminating apparatus are still to follow.

a large portion of the free room for the service of the gun, have been removed.

As already indicated, differences exist between turrets of the same kind furnished by different establishments, but they affect only minor details of construction; the gun mountings are also different. These two conditions, have, however, no further importance, as the turning of the turrets, as well as the loading and aiming of the guns, is effected in the same manner in all the turrets.

At present the manufacture of the 192 turrets ordered for the line of the Meuse is completed, but it still remains to construct those for the newly built forts at Antwerp.

Before the end of the article the turrets built in Belgium for the Belgian 12 cm. 25 calibre guns, as well as the disappearing armored search light stands constructed there also, will be more closely treated. For the sake of completeness, however, a few theoretical considerations will be first briefly stated, as they concern the armor question so much discussed within recent years.*

In order that the guns of a fortified place can effectually encounter the artillery of attack they must be protected by some sort of armor. Every project for such covering has certain principal conditions and fixed demands to fulfil, whose consideration in any particular case will determine the special character of the construction. With regard to the construction of turrets, these principal conditions, concerning which, however, there are disputed points, can be reduced to the following heads:

1. Choice of armor material.
2. Armor.
3. Glacis.
4. Turning.
5. Disappearing turrets.
6. Turrets for one or two guns.
7. Gun mounting, with or without recoil.
8. Traversing and pointing.
9. Accuracy of fire.
10. Resisting power.
11. External form.

1. *The choice of armor material.* A brief answer to the question of what is the best material for armor appears impracticable, and must in this respect depend upon the particular case. It is sufficient, for example, to remember that in the navy, for reasons which are not in consideration upon land, greater value is laid upon relatively light weight; the metal employed for armor upon men of war is therefore not the most advantageous for use upon land, because great weight contributes to the increase of stability and to the resistant power of the structure. Also, the means of attack upon armor are not in all cases the same and are becoming more and more proficient. On the other hand, metallurgy, with which the improvement in

* Although nothing new is really brought out by it, still, all reasonable points of view and aspects are treated in the article in the *Revue de l'Armée belge*, of August, 1891, and it is therefore mentioned here.

armor construction is closely related, is also making rapid progress. The answer to the question in point then reduces to this, to find that metal in each particular case which can resist given means of attack and which demands for its construction the shortest time and least expense.

The different armors may be divided into two classes:

1. That from which, on account of its high degree of hardness, the projectiles rebound, and

2. That in which the effect of the penetrating projectile is confined to the point of impact.

The former kind of armor prevents, of course, the penetration of the projectiles; on account of its brittleness, however, it becomes cracked, is consequently broken into pieces, and can in this way be breached. The latter kind is secure against falling to pieces, but cannot prevent the penetration of projectiles. Consequently there will have to be determined, under the conditions fixed by the defense in each particular case, the degree of hardness, or the desired toughness of the armor material, taking into consideration strength, weight and cost.

The metals employed in armor construction are chilled cast iron, wrought iron, compound plates and steel prepared by various processes.

The chilled cast iron unites, as is known, great hardness on the surface with soft and somewhat elastic masses in the interior; it permits any form desired, and is not high in price per unit of weight.

The disadvantage of the cast iron, permitting breaching by three or four hits at the same place with well hardened steel projectiles, led to the use of wrought iron for armor. The advantage of this metal over cast iron consists in its malleability and toughness; the effect of projectiles is confined to the point of impact. By the choice of this material the formation of cracks which appear in cast iron and result in its breaching is avoided; moreover, by a sufficient thickness of armor, the perforation of projectiles is prevented.

The generally increasing use of steel in engineering constructions led to its trial also for armor. The first results in this new direction were so far from satisfactory that as a result of them an attempt was made to combine the steel with wrought iron. An exterior plate was by various methods poured upon a wrought iron plate of generally twice its strength, and in that way arose the material known as compound armor. Competitive trials proved that a compound plate could not be perforated by projectiles that went through an equally thick wrought iron plate; the compound plate, to be sure, had cracks, still they were of such a nature that it could have withstood two or three more hits.

The considerable progress which metallurgy made in steel production, and the improvement in soft cast steel made in the open hearth furnace, led again to the employment of steel.*

Without going further it will be briefly stated that armor plates are pro-

*The superior soft steel castings from the Martin furnace are in Austria and Germany designated as ingot iron (Flusseisen), because it, in spite of its production from the fluid state, possesses fully the principal properties of wrought iron. A limit between ingot iron and ingot steel, although determined by the uncombined graphitic carbon it contained, cannot be sharply fixed. One can take about 0.2 per cent. carbon as the superior limit for ingot iron.

duced to-day from ingot steel, and in fact from soft material whose homogeneity, toughness, and power of resisting the impact and penetration of projectiles, are in no respect inferior to wrought iron plates. They are readily put into form corresponding to the object of their application, and when curved plates are required they are now cheaper than single plates of wrought iron.

2. *The armor.* The armor of forged or rolled steel as well as of nickel steel and compound plates, has less value for land fortification than for men-of-war. Malleability and toughness are the qualities for armor demanded by the engineer; cast metals can therefore be used with advantage, since they possess properties resembling wrought iron, permit moreover an accurate adjustment for strength, and in addition much stronger pieces can be produced for the same price.

The cupolas of the Meuse line are of forged iron, and only the cupolas of the search light stands are composed of a very soft ingot steel prepared after a special process, and resembling the best forged iron. Armor of soft and tough metal, although penetrated by projectiles striking normally, will resist oblique hits for a long time, and can be destroyed only after a prolonged firing with shells; this condition was the deciding one for its use in spite of its slight hardness.

The turrets of the Meuse line are covered on the interior with a double skin of steel plates 2 cm. thick. These are intended in an eventual destruction of the armor, to delay the falling of the pieces into the interior of the turret, as well as to secure a longer existence to the structure, and keep the cracks forming in the armor from view of the operating party.

The firing trials and strength tests made at the proving ground at Brasschaet were satisfactory.

3. *The Glacis.* The resisting power of the glacis is as important as that of the armor itself. A glacis which is readily destroyed would permit the substructure also to be destroyed, and in this way without its being a question of the cupola, the turret would be quickly disabled. Neither must the glacis be liable to changes of form as a result of the effect of projectiles, for such deformation in the vicinity of the circular cleft would naturally interfere with the turret's motion.

Chilled cast iron was chosen for the glacis of the turrets along the line of the Meuse. This material, which if cast in large blocks is not pierced by projectiles, offers sufficient resistance to the effect of shells and does not get out of shape; it has moreover the advantage of being easily produced in the desired form and size, as well as being less expensive than other material.

At the firing trials at Brasschaet one of the glacis plates manufactured by the Meuse Company was able to resist the penetrating effect of 10 shots fired against it with steel projectiles; and a 15 cm. shell loaded with dynamite produced no effect when exploded upon a similar plate.

The trials in Belgium have shown that chilled iron is the proper thing for the glacis. It would not be astonishing if for turret cupolas cast iron should be again used, provided with an inner skin of soft metal.

4. *The turning.* In the different constructions the turret revolves

about a central pivot, or with the aid of a circle of rollers. For the arrangement with a central pivot it was claimed that less power was necessary, and that consequently greater velocity of rotation was obtained. It is known, however, that the time necessary for loading the guns (heavy cannon upon a circular track) is always greater than that for rotation; so the advantage claimed does not exist. In turrets with two guns the arrangement with a central pivot has the decided disadvantage, because if the discharge of both guns does not take place simultaneously, the recoil of the one first fired always produces a turning of the turret, which as a result gives considerable side deflection for the second gun.*

In turrets with a ring of rollers this defect is of little importance, for there the tangential force arising must overcome a greater resistance. This matter is remedied by the use of brake mechanism, which fixes the turret in position during the firing of the guns. A ring of rollers is arranged for the turning of the turrets of the forts along the Meuse.

One thing further with reference to the construction with a central pivot. This method of turning has so far not been favored† because the central pivot takes up room and interferes with the general service; at any rate improvement is to be expected in this construction, which was first used in 1886.

5. *Disappearing turrets.* The effort to secure gun and embrasure against fire led to the disappearing turret.

The probability of hitting the guns has been considerably diminished by not allowing them to project beyond the embrasure in the new turrets, as well as by the fact that the guns can be fired during rotation.‡

The best known construction of disappearing turret is that of Schumann's. In the Mougin turret there was instead of the vertical motion an oscillation from front to rear.

The lowering of the cupola, however, complicates the construction; the cylindrical portion has little strength against horizontal fire, and the mechanism is generally delicate. In Schumann's construction the cylindrical part is 10 cm. thick. This thickness ought to be sufficient for turrets for rapid-fire guns, which are intended to sweep the adjacent ground within a radius of 400 metres; for turrets which had to engage with the second artillery position and the approaches this dimension ought at least to be doubled.

A disappearing turret for rapid-fire guns intended to fire against assaulting columns, is not in danger from the besieger's artillery, which must discontinue its attack. It can at most be fired upon by field-guns run forward quickly upon the flanks of the assaulting troops, and for this case the cylindrical part should have the thickness of 20 cm. In all other cases this thickness must be correspondingly increased.

At present the use of disappearing turrets is confined to rapid-fire

* For a displacement of five mm. measured at the circumference of the cupola, the side deflection measured at a distance of 2500 m. amounted to 4 m.

† At all events for heavy turrets and 2-gun turrets.

‡ It is not necessary to stop the rotation of the turret for firing. By means of an adjustable contact, the electric current fires the gun at the instant when the turret has, by its rotation, given the gun the proper aim.

guns. Those for two 15 cm. guns require steam power for manœuvring the cupola; it is, however, an open question whether they may not be successfully constructed with simpler mechanical arrangements, etc., so that these turrets will come to be no more expensive than those ordinarily now used.

6. *Turrets for one or two guns.* The views upon this point differ.

For turrets for one gun the following reasons are advanced:

1. With two guns the armor in the vicinity of the embrasures is weakened. Little value is attached to this, however, as the weakened part has been strengthened by reinforcing the embrasures (schartenbusen). In disappearing turrets this condition is without importance.

2. If a gun is dismounted a second gun cannot be used until the first is replaced. If this is not done the turret has only the value of one with a single gun, while it incurs double danger on account of the second embrasure.

3. In turrets with two guns there is necessarily a larger operating force, and an embrasure shot would be likely to disable more men.

4. If such a turret is from any cause inoperative, two guns are thereby removed from the conflict.

5. For the destruction of a one gun turret the same time and the same munitions are required as for a turret of two guns. Then with the reduction of turret diameter, the cupola becomes of greater resisting power, so that it can be strictly said that, even leaving out the diminution of the target, the time and expenditure of ammunition required for the turret of one gun will be rather greater. This last condition is really one of the most important for the employment of single gun turrets.

In opposition to these the following are given for two-gun turrets:

1. It can fire two guns simultaneously, by which greater effects can be obtained.

From various causes (in equality of metals, of powders, and of the accidental turret motion, etc.) this is not secured, for the striking points of the projectile always lie quite widely apart. The turning of the turret, as already stated, is certainly prevented by brakes, but there still remains the effect of the recoil which lifts the front of the turret. Accurate volley fire is therefore attainable only with isolated guns pointed independently of each other.

2. The radius of the cupola can be increased, and by this means its convexity diminished, so that the turret will evidently be less liable to be seen; the greater diameter offers, however, a greater exposed surface.

3. In the arrangement of turrets with two guns the works can be built smaller, which conduces to economy.

4. They demand a relatively smaller operating force.

5. A turret for two guns is cheaper than two one-gun turrets if the necessary substructure, magazine, etc., be considered.

Krupp has, as is known, proposed a compromise between these two kinds of turrets, in which he armed the turret with one gun, but set up a couple of carriages in it. The two embrasures lie about 120 degrees apart, and one is closed by a bolt-fastened steel plug.

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From the above it appears that, in general, reasons of a financial nature call for the two-gun turret. From military grounds the one-gun turret will always be preferred.

7. Gun mounting with or without recoil.

In Germany the first endeavor was, as is well-known, to replace the ordinary carriages with hydraulic braking apparatus by similar ones without recoil, and sometimes in such a way that the mass of the turret was available for this purpose. Although the trials made with such turrets appear to have turned out favorably,* still the objection is made that here also, in the case of volley firing, if the discharge of both guns does not take place simultaneously, an effort is shown to raise the cupola in the plane of fire.

Further trials with an improved form have proved that in a non recoil turret for two 15 cm. guns the elevation was not at all affected while the side deviation amounted to 9 minutes.

According to the experiments hitherto made, non-recoil can be successfully applied only to turrets with one gun; in other cases one must be content simply to diminish the recoil, so that the tendency to displace the turret will, as far as raising it in the plane of fire is concerned, be considerably diminished.†

Checking the recoil permits a diminution in the diameter of the turret. In that case the turret must be strengthened so that it may not be injured by the shock. Undoubtedly both systems have advantages, the choice between them being influenced by existing circumstances.

8. *The Aiming and Pointing.* Indirect fire scatters considerably. In France it is subject to regulations for all guns serving for the defense of a strongly fortified place, as well as for those of the intermediate batteries. Schumann's constructions are always arranged throughout for this. This kind of fire has in spite of great advantages, disadvantages as well; still, direct fire is not, on account of these disadvantages, prescribed in every case; a careful study of this question will show, however, that it is indispensably necessary that the possibility of direct fire should be preserved. On this account the Belgian turrets are arranged in such manner that they can use either direct or indirect fire at pleasure; the angle of elevation varies between $-2°$ and $+25.°$

Direct sighting with the exception of turrets for rapid-fire guns can no longer be done through the embrasure, on account of its being necessarily hermetically closed in order to keep out the fragments of shells, and use must be made of a manhole or peep slot; the closing manhole to be used for long distances where infantry fire and that of rapid-fire guns is not to be expected: the peep slot to be used for close distances. The indirect laying is done by the turret scale.

9. *Accuracy of Fire.* The great precision of turret fire was shown in the competitive trials undertaken at Cotroceni in the years 1885 and 1886; this has been further established recently in France by the firing from the tur-

* In one turret for two 15 cm. guns no change could be perceived after firing 260 rounds.

† In a turret for one 12 cm. gun with 0.13 metres recoil, the lifting tendency reduces to $\frac{1}{10}$.

In a turret for two 15 cm. guns when both guns are fired horizontally, this amounts to a calculated value of 912 t. When the recoil is reduced by the use of an hydraulic buffer to 0.30 m. this tendency becomes 45 t., *i. e.* approximately 5 per cent. of its former value.

rets of the Paris forts and from those of the fortifications along the eastern boundary; the empirical firing tables on this subject show strikingly smaller mean deviations, even to 50 per cent. less dispersion than is shown in the firing tables for similar guns upon wheeled carriages.

10. *Resisting Power.* The trials made upon the firing grounds of the several turret building companies offer no reliable data in this direction; in this respect dependence can only be placed upon the firing trials made by the different governments at Bucharest in 1885 and 1886; Spezia in 1886: Chalons in 1887; and those which have taken place in France, Germany and Belgium in consequence of the fortifications along the Meuse. From these it appears in general that steel projectiles of small calibre break to pieces against an inclined hard armor, as do also those of large calibre; furthermore that the ultimate breaching of the cupola due to the formation of cracks cannot be counted on.

Among direct hits, *i. e.*, flat trajectory shots, only those are dangerous which penetrate through an embrasure; these, however, due to the diminution of the embrasure opening, as well as to the fact that the gun does not project from the armor, will seldom occur. The enemy can be deceived in this respect by means of false embrasures painted on, and experiments in Belgium have shown that it was impossible to distinguish such painted embrasures from the actual ones.

The trials and experiments made with reference to the effect of high explosive shells are everywhere kept secret; the data which has, however, become known so far, is of an unreliable character. The mine effect is produced only by the bursting charge, and is the greater the closer the contact between the projectile and the place to be destroyed; with the employment of delicate percussion fuses this conclusion was completely verified.

11 *External form.*—The cylindrical form with horizontal top is too visible; offers a large target surface; has but little resistance at the horizontal edge, and can easily be struck normally; it is for these reasons rejected. Only the spherical form has been used for some years because it offers a small target hard to hit, and the probability of hitting the embrasure is small. An inclined surface is always preferred because all kinds of projectiles which strike with the ogival portion, break to pieces. The most favorable curvature for a spherical cupola is that which gives an angle of impact of 30 degrees to a projectile striking it on the height of the embrasure.

The following is a general description of the turrets for 12 cm. guns constructed in the "Meuse" shops at Liege; that for the projector stands will then be given.

Belgian turrets for two 12 cm. guns.

A revolving turret for two 12 cm. guns is composed of the following parts:*

1. Revolving substructure with the cupola.
2. Gun carriages and elevating apparatus.
3. Intermediate story.
4. Lowest floor and ammunition lifts.
5. Ventilating and turning apparatus.
6. Glacis.

* That for one 12 cm. gun is similarly constructed, and has merely a similar diameter.

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1. The revolving substructure with the turret cupola. The revolving cylindrical substructure is made up of iron plates 20 mm. thick; it has a diameter of 5.0 m. and a height of about 2.20 m. and is braced by a number of vertical stayplates. A door placed in the cylinder communicates with the outer circular gallery. At the upper edge of the substructure is a circular rim formed of plates and angle irons. The groove thus formed in which the cupola rests is filled with lead.

In the cupola are placed:

1. The two embrasures. 2. The observatory opening, which can be closed by an adjustable cap. 3. The peep hole.

The cupola consists of three rolled iron plates 20 cm. thick, and together weighing 38 t. Both joints lie in vertical planes perpendicular to the plane of fire. A strong block of steel cast to the cupola in the vicinity of the two embrasures, strengthens this part of the turret. Upon the interior there is a steel skin consisting of two plates 20 mm. thick, riveted together; it is fastened to the cupola with screws.

At the lower edge of the substructure is an upper circular track braced by plates and angle irons rivetted to each other at right angles; a second similar circular track is imbedded in the concrete of the masonry substructure beneath; between the two tracks are conical rollers. The vertical braces give the iron substructure the necessary strength in each direction.

Special iron cross pieces carry the flooring. Two fixed ladders lead to the middle story below. Two trap doors permit the changing of the guns at any time, etc. For a single discharge the turret is fixed by two clamps.

2. The gun carriage and elevating apparatus. The two carriages are entirely independent of each other and of the cupola. Each consists of two cheeks which are fastened to the floor, to the cylindrical part of the substructure, and also to each other by two bolts.

The axis of revolution of the gun lies in the embrasure. Glycerine buffers diminish the recoil to 140 mm. and bring the gun back into position after firing. A shutter designed for the purpose prevents the entrance of gases through the embrasure into the interior.*

The gun together with the movable part of the carriage on which the buffer for the prevention of recoil is situated, is so counterbalanced upon the lower part that it can easily be brought into the desired position for loading.

3. The middle story. From this the direction of the turret is effected by bringing it to the azimuth desired by means of the fixed pointers upon the movable graduated circle. Under the pointer is placed a speaking tube which opens into a recess in the lowest story where the turning apparatus is located.

The revolving of the turret is regulated very accurately, and permits a close setting in azimuth.

In the top story is placed a second turning apparatus by means of a hand wheel upon the circular rack, fastened to the lower roller track. This serves to turn the turret in firing upon moving objects for which purpose the observing hole is used.

* With reference to the details not fully described here, attention is called to the French turret of Chatillon-Commentry whose description comes later.

4. The lowest story and ammunition lift. From the magazine the ammunition is taken through a door into the lowest story, and is then by two ammunition lifts, one for each gun, raised to the place for using it.

5. Ventilating and turning apparatus. A ventilator situated in a recess of the lowest story and operated there serves for the ventilation of the turret. The air supply flows into the top story, and upon the opening of the breech-blocks drives the powder gases out through the bore. The gases to be found on the interior in consequence of the ignition of the charge, are blown out into the circular gallery by the current of the air through the valves set in the substructure, and which excludes external gases.

6. The glacis. The glacis consists of six segmental shaped chilled iron blocks. Four of them are at the upper part 0.32 m. and at the lower part 0.24 m. thick. With two these dimensions are diminished to 0.24 m. and 0.18 m. The joints are filled with lead.

[*To be continued.*]

Military Notes.

CAVALRY PROBLEMS.

EVERY ounce saved in kit or equipment, as the German Emperor has recognized, every muscle given freer play, gives more power to the soldier, and what is true of infantry is true of cavalry. We are therefore very glad to see that the question of weight in so far as it concerns cavalry, has been boldly grappled by Mr. C. Stein in *Blackwood's Magazine* for May. If cavalry are to have any *raison d'être*, he rightly says this must depend entirely on their capacity for long continued rapid movement, and on their shock-power; and he asks those who are inclined to think the weight of a belt or a pair of stockings of small moment, to remember what handicapping is on a race-course. He gives the weight of the present equipment—saddlery, etc. (3st. 7lb. 8oz.), sword and scabbard, carbine, pouch and belt, cloak, cape, kit (1st. 3lb. 15oz.), waterproof sheet, and picketing gear—as 7st. 11lb. 4oz. in all; and, adding 11st. 7lb. for the weight of a man in his campaigning clothes, arrives at the "astounding burden" of 18st. 8lb. 4oz. as borne upon the horse's back—and this, too, without ammunition, food, or horse provender; or any pioneer, signalling or farriery equipment, or any musical instruments or tools, such as many troopers must carry. "We would ask any man who has ever followed to hounds," says Mr. Stein—"and a day's campaigning is very like a day's hunting—how he would like to place between 19 and 20st. on his well-bred hunter?" This question of lightening the cavalry troop-horse's load is one we have pressed for years, and it is satisfactory to find that it is beginning to catch on outside service circles.

Mr. Stein enters upon his discussion by confessing that he is not in a position to touch upon the question of saddlery; but is naturally well content to leave the matter in the competent hands of Lieutenant-General Keith Fraser, Inspector-General of Cavalry. He protests that the pouch and belts are ridiculously heavy for the work they have to do. Would a sportsman care to carry so solidly made a pouch and pouch-belt, and why should not the sword-belt and slings be reduced to half their size, now that the sword, except upon dismounted service, is attached to the saddle? By these reforms Mr. Stein would reduce the weight of pouch and belts from 2lb. 6oz. to 1lb. 6oz. Another suggestion is in regard to the woollen overcoat and cape, and the waterproof sheet. It is undoubtedly true that the coat and cape absorb moisture, and thereby add to their weight appreciably. Mr. Stein would substitute for the present woollen cape a waterproof one, such as the police wear, and would abolish the waterproof sheet, the

saving being about 2lb. in weight. He thinks his cape might be adapted to the purposes of the sheet, while it would largely protect the overcoat from becoming wet, and therefore heavier. We believe that much greater protest will be raised against his proposals in regard to underclothing. True, he does not contemplate campaigning in wild countries, and would not separate a man from his belongings for any very extended period. The spare clothing would be with the heavy baggage, and opportunities would be found of getting at it. He would leave the cavalryman his field-service cap and pair of drawers, but thinks the rest have no relation to military efficiency, and, as to "comfort, scorned of devils," evidently considers that the campaigner should be above it. On the other hand, it may certainly be argued that a degree of comfort and efficiency go together; nor have we the right to subject our troopers to "temporary uncleanness and divorce from the proprieties of civilization," even if we give them "sufficient food to maintain physical energy." Mr. Stein is prepared to find two camps among the doctors, but urges against his opponents that it was not the want of choice of clothes, but the want of them altogether, that operated so disastrously in the Crimea. Does not campaigning soon find out weak places in men? The frequent obligatory use of "towel and soap" will do much to keep men in health, but still we are inclined to say that Mr. Stein gives away his case when he pictures a body of men "in the prime of life, all free from tendency to disease, specially passed by medical examination as perfectly sound, and not likely to suffer from want of food." As to such he asks: "What danger of injury to health can there be in the fact that they may possibly be debarred from changing their underclothing and boots for a fortnight, a month, or even longer?"

From these points Mr. Stein turns to the horse and arms. "Beautifully arranged horse-lines" he believes to be quite unnecessary on active service. He would therefore do away with all the picketing gear, save the head-rope, in the expectation of finding a tree or fence to which this could be attached, but otherwise would "bush" the end, on a well-known system, explained in Galton's "Art of Travel." Thus would a diminution of weight, to the extent of 4lb. 3oz., be effected. Another moot point, not to be lightly settled, is that of the sword and its use. Mr. Stein is possessed with the belief that a sword weighing 2lb. 9½oz. cannot be wielded without dire fatigue and exhaustion, amounting to helplessness, for a period exceeding five minutes, if as much. He denounces the whole sword exercise, but few will admit either his premises or conclusions when he says we should thrust and not cut. As the cut depends upon the vigor of the soldier's arm, it gains nothing from the crash and impetus of the charge; even if the edge falls true, it may encounter a button, a belt, or a pouch, which will prevent it from penetrating. On the other hand, a thrusting sword, with its scabbard, can be made much lighter, and would be far more effective, assisted by the sheer weight of horse and man. The heavy cavalry of Napoleon, in fact, habitually made use of the point, and were armed with that view. From this matter Mr. Stein passes on to a consideration of the employment of machine-guns by cavalry, basing his remarks largely upon Captain Anstruther Thomson's paper, read at the Royal United Service Institution,

and forecasts a great future for these engines so used. Upon this he bases a very bold suggestion for a radical change. He considers that the introduction of a long-range carbine tends to cause cavalry to fall away from their true rôle of shock-action and close combat. If fire-power is necessary, they have it now in the Maxim gun. "Meanwhile, all the cavalry will remain ready to make an immediate swoop when the propitious moment arrives." What need have we, in short, for the heavy carbine? Mr. Stein does not wish to deprive the trooper of fire-arms altogether, for the sword may be lost or broken. He would therefore provide him with a revolver, the efficient use of which, he says, by cavalrymen in their own sphere of shock and close action, is merely a matter of training. This, of course, is a far-reaching proposal, which is not to be settled off-hand; but Mr. Stein has done good service in ventilating it, and useful discussion may follow. His purpose of relieving the trooper's horse is excellent, and, as he humorously says, perhaps some student will "go one better." Summarizing his arguments, he concludes that the following saving in weight might be effected: 1lb. on the belts; 2lb. by his proposed change in regard to the waterproof cape; 6lb. ½oz. by dispensing with spare clothes; 4lb. 3oz. by reducing the picketing gear; 5lb. 2oz. by substituting a revolver for the carbine; and 1lb. 8oz. by modifying the sword and scabbard; or in all, a diminution of 1st. 5lb. 13½oz. The paper is worth reading, for it raises points of controversy, and at a time like the present, when Continental cavalry is engaging so much attention, it is well that the state of our own mounted services should be kept well in view. A writer more practically acquainted with the subject in all its bearings would have approached some of its branches with more diffidence, and would have included others which are entirely omitted, but his paper is interesting, as showing the view taken by an educated man of a question too much neglected in the British army. It is to be hoped that cavalry officers of experience will take up the points raised, and discuss them freely, for Mr. Stein undoubtedly has brought forward some important questions which cannot fail to produce a good effect if properly approached by those who are qualified to express an opinion on the equipment of their arm.— *The Army and Navy Gazette.*

GERMAN ARTILLERY DRILL.

The Intelligence Department of the Horse Guards has just reproduced the Drill Regulations of the German Field Artillery. The work has been translated by Captain W. A. Macbean, R. A.

In the introduction we are told:—"1. The object of drill is the training and preparation of leaders and men for their duties in war. All exercises therefore must be based upon the conditions of war. The most important demands which war makes are: the strictest discipline and order, coupled with extreme tension of every faculty. So to foster these qualities among troops, that they may become second nature, is one of the chief aims of all drills. In war, simplicity alone gives promise of success. It is requisite therefore to learn and apply a few simple forms only, but these must be rigidly inculcated and thoroughly mastered. All petty over-refinements are prohibited.

"2. Every officer in command of troops, from the battery commander upwards, is responsible for the training, according to regulation, of the troops placed under his command, and he is to be given the utmost latitude in choosing his means for that end. It is the duty of immediate superiors to interfere as soon as they notice misapprehensions and shortcomings.

"3. Training without and with guns is completed within the battery. In the brigade division, the coöperation, according to regulation, of several batteries for a common tactical purpose is to be practised. Large artillery units are directed by transmitted orders only.

"4. Long-continued repetition of one and the same matter is fatiguing to mind and body. Variety must therefore be introduced into drills and exercises. Their nature and duration must, moreover, be proportioned to the powers of man and horse; otherwise the inevitable slackening of mental concentration imperils discipline. Training in easy ground must be supplemented as frequently as possible by varied exercises in difficult ground. Every opportunity, every time of year, must be utilized for this end. Junior officers must also be given the opportunity of learning to command a battery, for this task will fall upon them in war. Of especial value to field artillery are exercises executed by units upon war strength, for by this means alone can the difficulties be appreciated and mastered, which are attendant upon the employment of such units.

"5. The mission of field artillery is to prepare the road to victory. The paramount consideration for field artillery is therefore good shooting, at the right time and from the right place. This requires complete mastery of the arm, with its many-sided peculiarities, and great mobility.

"6. Commands are divided into cautions and executive words of command. A slack word of command leads to slack performance. Words of command, therefore, in every situation, in every place and in every kind of duty, must be given with the same smartness. The words of command given in the regulations are alone to be used. If words of command, calls, and signals do not suffice, these are replaced by transmitted orders.

"7. Commanders of all ranks are responsible that the Drill Regulations are thoroughly practised, and that the spirit of their requirements is fully satisfied."

In Part III., "Training with Guns, Mounted," it is said that "the training of the battery commences with instruction in driving. As soon as the requisite profiency is attained in driving, drill is commenced. This is at first to be carried out upon level ground with no other object than the inculcation of the prescribed formations and movements. Here it is of no consequence which gun is on a flank, but sections are not to be broken up; to form front rapidly in any direction is the paramount consideration. During training special importance is to be attached to the following points:— To a long steady trot in column of route over all kinds of ground. To rapid formation of line. To quickly fixing upon various points to march upon when in line at open interval. To smartness in unlimbering and limbering up. Strict service of the guns according to regulation, coupled with the employment of targets such as will be met with in war, is always to be carefully kept in view. According as progress is made in drill, exercises are

combined with a tactical purpose and transferred to difficult ground. In brigade division training drill under tactical conditions is to be made the chief consideration."

In Part IV., "Battle," we find the following "Introduction":—"The service element of peace exercises lies in the correct selection of forms for the specific object of the action, combined at the same time with utilization of ground. This selection must be such as is imperative in order to attain the greatest effect upon our side, and as is permissible in order to diminish the effect produced by the enemy. Exercises must be graduated from the easy to the difficult; hence they are to be carried out upon the basis of a simple tactical situation, first in the battery, then in the brigade division and in larger units, at first in open and easy ground, then in difficult ground. By degrees, harassing circumstances of every kind are to be introduced and taken as a basis, and especially the carrying on of the action under the assumption of great losses."

And under head of "Orders" it is laid down:—"Until the action commences the place of the artillery commander is with the commander of the troop unit to which he is attached. First, he must receive from this commander the orders necessary for the conduct of the action. He then takes charge of his command, or, after the grouping of the troops, of the united greater portion of it, but keeps up constant communication with the commander of the troops. If during the action batteries or portions of batteries come into position within a strange brigade, division or battery, they come under the orders of the commander of this brigade, division or battery. The reëstablishment of units must be striven for when position is changed. Upon the same principle, batteries of a cavalry division, when employed in conjunction with another force of artillery, come under the orders of the higher artillery commander in command at that spot. The battery is always, the brigade division only so far as is feasible, directed by commands, trumpet sounds, and signals. In larger units than these, instructions and transmitted orders are substituted for the above. The employment of trumpet calls is to be restricted as far as possible. It is the especial duty of every officer and non-commissioned officer to see that the order to halt or front is at once executed within the sphere of his command, and that the order is passed on. Officers, or, if not available, orderlies, are to be as far as possible employed to carry the more important verbal orders. The latter must be so far trained for this duty that they understand the sense of the orders they receive."

The general principles are thus summed up:—"The fire-action will, as a rule, be commenced by artillery. Here it is important in most cases to be able to develop a superior number of guns from the very outset, and to produce a mass effect at an early period. Since the selection of the first artillery position frequently has a decisive effect upon the general deployment, but is always dependent upon the tactical plans of the commander of the force, the artillery commander must receive orders upon this point, as also as to what force of artillery is at first to be developed. The fire effect of artillery should principally be utilized at ranges beyond the zone of effective infantry fire, but it must be laid down as a principle that our own in-

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fantry must never lack artillery support; therefore at decisive moments artillery must never shrink from the very heaviest infantry fire. Artillery is, as a matter of principle, protected by advanced infantry from the fire of hostile infantry. As a rule, artillery has no need of special protection. Every body of troops in the vicinity of imperilled batteries is bound to render assistance. A battery which has exhausted its ammunition must not retire, but must await the arrival of ammunition in its fighting position. Batteries in action are not relieved, but are supported by fresh ones arriving. Even heavy losses are no reason for the evacuation of a position. Retirements are, as a matter of principle, commenced at the walk. Earthworks for purposes of protection, especially of the men, against the enemy's fire are always advisable, even in an offensive action, when there is time for their construction. In prepared defensive positions they are to be employed upon an extensive scale. Cover for limbers and ammunition wagons will only be practicable in long-prepared positions or in siege warfare. In order to diminish loss, it is advisable to order the personnel of the battery to kneel down when under fire. Artillery must gain protection against surprise by its own watchfulness, in addition to the protection afforded by the other arms. When the fighting position is occupied, attention should especially be directed to an unprotected flank, and every flank battery is, without any special instructions, responsible for reconnaissance to the flank. Should hostile cavalry get into the battery, the struggle is continued with the revolver, and is by no means hopeless. Officers and men get between the wheels; the carriages of the lines of wagons close together. Horse batteries are especially adapted for speedily reinforcing a threatened point or utilizing favorable moments in the action. Direct fire is to be preferred to indirect fire; but the latter will have to be used when the ground or the state of the action do not permit of direct fire. In some cases isolated batteries, hidden from view, and difficult of discovery by the enemy, may, by the effect they produce in a specified direction, afford the means of gaining the superiority of fire."—*The Army and Navy Gazette.*

PASSAGE OF RIVERS BY CAVALRY.

An important step to facilitate the passage of rivers by cavalry has been initiated by Lieut. M. F. Rimington, of the Inniskilling Dragoons. He has had some corn sacks made up according to the regulation pattern, out of Willesden waterproof canvas. Each sack when stuffed with straw or hay will float a weight of 150 pounds, and when lashed together in any required number to a framework of light poles or lances, a most efficient raft can be formed. A few days ago a squadron of 66 horses was taken across the bridging pond at Aldershot by those means, in twenty minutes. The best plan was found to be to make a long rope out of the head-ropes, picket it across the river or stream, and let one man on the raft work it across hand over hand. A few boards, or the tail board of a squadron cart made it comfortable to stand on. A single sack will hold a saddle and kit complete. With these in, it will float and can be towed across. They may be also easily rigged up with lances as poles to form a shelter tent, and can be used as a waterproof cape, etc.—*Journal Royal U. S. Institution.*

STRENGTH OF BRITISH ARMY.

The latest returns, to January 1, 1894, of the British regular forces at home and abroad, show that the total number of of officers and men borne upon the regimental rolls (exclusive of the Indian native army) is very little below 220,000, and about 2000 more than were in the ranks a year ago. Of these, nearly 20,000 are cavalry, 37,000 artillery, 7500 engineers, 143,000 infantry, 5200 colonial troops, 3500 army service corps, and 2500 medical staff corps, the remainder being made up of the smaller departmental corps. Great Britain and Ireland retain nearly half the regular army for home service, there being little short of 107,000 troops in the three kingdoms,—74,000 in England and Wales, 28,000 in Ireland, 3500 in Scotland, and the residue in the Channel Islands. Aldershot shows the largest home aggregation, the Duke of Connaught having there 15,000 men, while the Metropolis and Home District have 8500, Portsmouth and the Southern District, 9500; Plymouth and the Western, 7200; Dover and the Southeastern, 7500; Woolwich and the Thames, 9400. Away from home, India always absorbs the greatest number of regular troops, and the men of the Imperial army there now reckon up about 77,000, or about 600 more than at this time last year. Of these, 15,500 are in Burma. The British strength in Egypt has been somewhat increased, and the 5000 men there are nearly 2000 more than a year ago, the principal increase being in infantry of the line. The regular forces scattered over the colonies in all parts of the world are 31,000 in number, and the Mediterranean stations occupy a considerable portion of these. Gibraltar has in its garrison 5000 men, and Malta 8000, while Cyprus has only about 600, mostly infantry and no artillerymen. After these stations have been reckoned, the remainder of the 31,000 give 3300 to the Cape and Natal, 1000 to the West African settlements (where the regular troops are principally the colored soldiers of the West India regiments), 2900 to Hong Kong, 1500 to the Straits Settlements, 1600 to Ceylon, 1400 to Nova Scotia (the only portion of the Dominion of Canada garrisoned by Imperial troops) 1600 to Jamaica, 1400 to Bermuda, 1300 to Barbadoes, 800 to Mauritius, and only 200 to St. Helena. Besides the home islands, India, and Egypt, Natal is the only part of the world where British cavalry is stationed; home and India have all the horse artillery; Egypt has field artillery as well as a cavalry regiment, the former being an addition since last year; and the mountain artillery are confined to home, India, and South Africa, while the garrison artillerymen, numbering in all nearly 18,000, are to be found in all the colonies (as well as at home and in India), with the exception of Cyprus, Natal, Penang, and the Gambia.—*London Times.*

THE ROYAL ARTILLERY.

Rumors have been rife that organic changes are contemplated in the Royal Artillery—abolition of the Royal Horse Artillery, *separation of branches*, and what not. We are able to give an emphatic contradiction to such reports.

The Garrison Artillery is the worst possible school for young officers, but while an officer is young the first thought of his seniors should be to make him a soldier. He must be taught like the young Spartan nobles of old "how to

obey and how to command." Like those who have gone before him, he must be made to tread the ladder of hard, severe, regimental discipline. There is no better training for the young artillery officer than as a subaltern and captain in a horse, field, or mountain battery, where he is kept at work under the eye of his commanding officer from morning till night in a way which is impossible in coast batteries. Fortunately, the authorities take this view, and have hitherto consistently refused to yield to irresponsible pressure from below. So far as we are concerned we shall lend no countenance to those who seek to upset a system, which has invariably succeeded in the past, and which is based upon a just appreciation of the varied services which the nation will demand from its artillery when its organization during peace is tried by the test of war service.—*The Army and Navy Gazette.*

THE WAR OF THE DRILL-BOOKS.

1. *Reglementarische Studien* (1893). Berlin: A. Barth.

2. *Praktische Taktik und Taktische Theorie. Polemische Betrachtungen über Reglementarische Fragen* (1893). Berlin: Luckhardt.

3. *Unsere Heutige Infanterie Taktik im Spiegel der Augustkämpfe, 1870, um Metz.* By W. von Scherff, General der Infanterie, z. D. Berlin: Mittler, 1893.

The above three works have all grown out of the controversy initiated in Germany by the publication of the 1889 Drill Book, and as our own drill books have given rise to a similar problem, it may be of interest to contemplate the German efforts towards its solution. Briefly stated, opinions in both countries are divided as to the degree of freedom which may safely be conceded to the junior ranks in the execution of the attack. The school in favor of the extreme "normal" attack was decisively routed in Germany many years ago. Public opinion then swung over pendulum-wise, and demanded unlimited license, and the "go as you please" style.

Practically, the army adopted a middle course, and by constant practice on the manœuvre ground, evolved a method which fairly met the conditions —neither too rigid on the one hand, nor too lax on the other. It was simply the outcome of the mutual knowledge and confidence engendered in all ranks by the habit of "playing together," much facilitated by the general principle that each man in his respective rank was held responsible, that the bugle sound "das ganze" or "stand fast," should find each in his right position relatively to his neighbors, whether he had received orders or not.

That is to say in simpler language, by dint of "playing together" the constituent elements of the army had evolved the same source of strength and unity of purpose that characterizes a good football or polo team—a gain which we in England should find no difficulty in appreciating.

But German officers have no time to play polo and football; moreover, as a race, they are in the habit of attaching more importance to the printed word and its logical consequences than to the actual fact, and, judging by this controversy, the disputants seem to have been far more occupied by the pen and ink arguments, for and against, than by the actual evolution of things.

A number of papers pleaded the cause of subaltern emancipation, with

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a misdirected zeal and fervor worthy of our English "wild women," and against these Scherff took up his pen, pointing out, with that rare logical precision peculiar to himself, that this freedom might be abused, and that, within reasonable limits, combined and prescribed action was still imperative. His opponents hailed him as a reactionary of the most extreme order, and others joined in the cry without taking the trouble to study his articles; and this has necessitated the two last-named of the above-mentioned works.

A few words as to the personality of the author, gathered from recent conversations in Berlin, may be of interest, for we find a complete misconception existing in the minds of most British officers on the subject. To us he is chiefly known by his first work, "The New Tactics of Infantry," which appeared about 1873, and which alone has been translated.

His style must bear the responsibility; it requires concentrated effort to study, and in the original is almost repugnant to English readers. For this he is not altogether to blame, it is rather the custom of the country; Germans writing on subjects which require precise thinking care nothing for literary style, but everything for clearness; moreover, their whole military education is directed to teach them to think and reason, not merely to learn by heart, and as they take their profession very seriously, they are not averse to the effort of concentrated attention involved.

Judging him by his works, most of us appear to have a conception of the man as a pedant, with the usual accessories of spectacles, stooping shoulders, etc. Nothing could be further from the truth; from the unanimous testimony of those who have served under him, he is a practical, hard and energetic officer, capable of inspiring absolute confidence in his subordinates. The reason is not far to seek. Men accustomed to precise and logical thinking can forecast rapidly, and with certainty, the consequences of their decisions; it is only the man who cannot foresee the consequences of his action who finds it necessary to hesitate.

Of war service the General has had his share. Besides the 1866 campaign, he was on Schwarzkoppen's staff at the attack of the Bruville heights, on the 16th of August, 1870, Mars-la-Tour, and with the division throughout the war. His presence at the slaughter of Wedell's (38th) brigade seems to have left an abiding impression on his method of thought. The brigade, it will be remembered, engaged without artillery support, under every disadvantage of armament, numbers, and want of superior direction, and was cut to pieces as a consequence. It is not straining the probabilities too much to assume that this want of artillery preparation, and of superior direction, left their mark on his mind.

To summarize the contents of these three volumes briefly. The General points out (1) that practically all flank attacks end locally in frontal ones; (2) that infantry, whilst not disdaining artillery assistance, must, in the last resort, be prepared to rely on themselves alone, on pain of abdicating their position as "Hauptwaffe" and becoming a mere auxiliary; (3) that strategical considerations rule higher than local tactical ones, and therefore infantry must expect to have to fight when and where they are ordered, and not when and where the ground and convenience dictates; (4) finally, that though as the fight progresses the cohesion of the units in each grade of

command successively is destroyed, yet each leader in turn must keep in his hands the direction of his command, as a whole, until effectual superintendence ceases to be possible.

Though we recommend the study of his works most cordially, we feel it nevertheless, necessary to add a word of caution. Scherff deals with tactical problems "logically," but the matter does not always lend itself to logic. The success or failure of an attack or an evolution depends on the product of a large number of variants, several of which may be of an indeterminate nature. The only way to approach the question seems to us to be by the mathematical method of limitations, and considering the consequences of variations in each factor between certain limits. It is this which constitutes the difficulty of the subject; each factor may be simple enough as a whole, but it is their number, and the impossibility of assigning relative numerical values to each of them, which constitute in the aggregate a difficulty which hitherto none but the greatest geniuses have succeeded in overcoming.—F. N. M.—*Journal Royal U. S. Institution.*

REDUCTION OF CALIBRE IN LARGE GUNS.

The reduction of calibre is no longer limited to small arms and field-guns; it now extends to naval guns of the heaviest calibre. At any rate it is a curious coincidence that we are informed almost simultaneously from France and England that the present heaviest guns are to be replaced by guns of smaller calibre.

In England the guns of 41.3 cm. and 34.3 cm. calibre and 111 and 68 tons w. are to be replaced by guns of 30.5 and 50 tons w. as heaviest guns aboard the largest battle-ships lately laid down. The *Magnificent* and *Majestic*, of 15,000 tons each, are to be thus armed.—*Militair Wochenblatt. C. R.*

GERMAN MILITARY SERVICE INSURANCE AT HANOVER.

Its purpose is to diminish the expenses of military service, to assist professional soldiers, provide for invalids—boys under 12 years of age alone are admitted in this department. Second is the insurance of capital to be paid at a certain age or at death. The latest report shows the following: In 1893 there were written 22,650 insurances, with 25,520,514 marks insurance. At the end of 1893 there were in existence 178,242 contracts, with a capital of 207,809,278 marks, the increase for 1893 being 15,514 contracts, with 17,835,298 marks capital.—*Militair Wochenblatt. C. R.*

A NEW QUICK-FIRING GUN.

SPAIN.—Lieutenant Colonel Ordonez has constructed a new gun of which the following data are furnished: It is a steel 12 cm. quick-firing gun. It consists of the inner tube, the jacket and the quick-firing breech mechanism, the first two being each made in one piece. With the metal cartridge four projectiles weighing 25 kgm. are used, common shell, torpedo shell, shrapnel and canister. According to Gavre's formula the initial velocity is to be 729 m.; maximum pressure, 1877 kgm. per square cm., with a charge of 7 kgm. of smokeless powder, or 632 m., 23 kgm., with a charge of 12.5 kgm. of black powder, with a density of 1.8. The gun is 45 calibres long.—*Militair Wochenblatt. C. R.*

Reviews and Exchanges.

Leonidas Polk. *

THIS life of a truly noble subject is the labor of love of a devoted and admiring son who probably even falls short of full justice to his father. As a contribution to history it fills out that gruesome skeleton ; puts flesh and skin and pleasant proportions on the bare, dry story of war. It gives the inner motive, sometimes painfully personal, homely, and human, to great national events. As a record of domestic life it is idyllic.

We do not think with the author that any explanation or excuse was needed for the good bishop's taking the part he did in secession. Though not a very active part in the beginning, it was probably as active as that of any one else not a politician or civic leader. He evidently was heartily in accordance with it from long previous conviction of its necessity from a southern standpoint. The book wishes to establish the healthfulness of the bishop's holdings on :

1. The subject of slavery.
2. It shows his sympathy, in his youth, with the colonization of the black.
3. And that slavery was a misfortune to be got rid of,—when it should be possible to do so with mutual profit to the owner and to the slave.
4. That in the near future the then border states would get rid of it.
5. But that it would be indefinitely necessary in the cotton states.
6. That the owner had the right to carry his *property* (slaves) to the territories and be protected in his possession. [It strikes us at this late day that if the general government should have protected us in the property, under its ægis, it was not in the power of a nascent state to deprive us of it. If this be a correct position, one slaveholder could force slavery on a state, or have held his property an exception, a *fuero*, as the Spanish call it.]
7. That the pending differences and existing discordances rendered necessary for the church a great sectional educational establishment in the south to inculcate these principles, or to educate a body of men in full sympathy with them.
8. And especially to create a *clergy* fully imbued with these tenets.

Another thing which the doctor permits us to see very clearly is that he is impressed with the injustice of the north in making war for such a slight thing as being denationalized by the immediate residents on more than six hundred millions acres of our birthright. No, no, Doctor, that is too old a southern joke.

Of course we meet also, but less than is usual in such works, charges of our impropriety in conducting the war so as to rob the confederates of their food, clothing, and other means of prosecuting the war against us, often leaving their women nothing to send to their husbands in the field.

The family name appears to have been originally Pollock, but after arriving in this country the ancestry became contracted to Polk. We judge the "1" should be

* *Leonidas Polk, Bishop and General.* By Wm. M. Polk, M. D., LL. D. In two volumes. New York : Longmans, Green & Co. 1893.

articulated, but we oftener hear *Poke* than Polk. The author defends his great grandfather, General Thomas Polk, against a charge of toryism in the revolutionary war.

A good portion of the book is occupied in defending the bishop as such in his episcopal acts in the incipience of secession and in his afterward taking up the sword. We hold this to be unnecessary. The bishop was also a man, a very noble one, and however wrong he may have chosen his side, the wrong was not his, but the false and unnatural surroundings of his life. He saw clearly what his immediate interests were. He saw nothing unscriptural in his holdings, but all the southern christian logic, the Epistle to Philemon, and Lev. xxv:44-46 was considered as duly applicable to his surroundings as to the Israelite on entering Canaan. Unluckily we have no record of his decision when a question of emancipation arose, especially when the slaveholder raised the question.

We may give a cursory glance at the subjects of the work as they are treated and ask permission for a running comment.

A leadership is claimed for Gen. Thomas Polk, the bishop's grandfather, in the Mecklenburg Declaration of Independence and the authenticity of said document discussed. The evidence for it seems ample and yet Thomas Jefferson denounced it as a fabrication. We think that the similarity of expression in the Jeffersonian and Mecklenburg declarations are easily explicable. The incubation of the American revolution was a long period in which discontent was by no means silent. Franklin, Patrick Henry, and many great patriots had given their tongues and pens to this discontent. "Catch phrases" had been taken up by the village orators from printed matter very generally scattered through the country, nor is it likely that their pungent words would be kept restricted to the minds of their direct auditors. The "forms of thought" common to the two documents were probably not original to the authors of either. We quote from the Mecklenburg, not so well known.

"That we do hereby declare ourselves a free and independent people; are and of right ought to be a sovereign and self-governing association under control of no power other than that of God and the general government of the congress, to the maintenance of which independence we solemnly pledge to each other our mutual coöperation, our lives, our fortunes, and our most sacred honor."

The very interesting story of the bishop's cadet life is given. In speaking of some of the wrongs he suffered, he arraigns Colonel Thayer's system of espionage. This brings to mind how close a system of observation the colonel kept over the cadet's finances, and shows some of the means used to impress the cadet with the superintendent's omniscience. A cadet would enter asking for an "order" for some desired convenience; the colonel would say, Sir, you are in debt [five dollars and seventy-nine cents]. The cadet would stand amazed at the specific memory of the man, and was at the same time flattered to know that his personal interests were so well cared for. How this remarkable knowledge was kept on hand was only known years after the colonel's death. "Old Tim O'Mahar" (dear Old Tim, our heart warms at the remembrance of your bountiful hospitality) was the adjutant's clerk, and at each bimonthly (muster-day) settlement he supplied Col. T. with a series of small slips alphabetically arranged containing the cadet's balance, plus or minus (minus generally). These slips the colonel pasted within the pigeon holes against the back of his desk. As soon as the cadet's name was announced, the colonel would cast a glance into the properly lettered pigeon hole, and seize the weapon to be used to the cadet's confusion and the conquest of his mind. "There are tricks in all trades."

While our subject was a cadet, the afterward Bishop McIlvaine was the chaplain at West Point and says that "Leonidas Polk was the first known instance in the history

of the academy of a cadet having come out and taken position as a follower of Christ."

On page 80 a question is suggested which should demand an answer from every officer of the army. In a letter to his father Cadet Polk writes,—"For the interests of the academy and the country it is greatly to be desired that the Board of Visitors would add to the course another year, in which polite learning should at least be taught, if not exclusively. For my own part, I would more readily spend my fifth year in a course of reading than in doing the duties of a lieutenant. My classical education is imperfect. My knowledge of history and indeed of most books aside from my text books is exceedingly limited; and I feel great unwillingness to close my eyes to all this life while only an effort is wanting to its enjoyment." Brother officer, have you never groaned over your ignorant illiteracy after graduation? It is vain that we should answer, "Yes, but I know some things my civil professional friend does not know." The retort would be, "Yes, and in his profession he knows some things you do not know."

The questions which arise are, 1. "Do the classics give a taste for subsequent development in general literary investigation that a scientific course at the military academy tends to dwarf? 2. How many would forego the exercise of their lieutenant functions for a year to come out with the superior polish that a fifth year should certainly give them? 3. Should the graduate be kept a year longer at the Point as a subaltern under a post-graduate course; the like of which is well known in foreign armies? We remember one who would have willingly spent another year at the academy in learning to speak French, in a course of botany under dear old Jake Bailey, and in history and general literature.

In 1828 upon graduation and appointment Lieutenant Polk resigned to enter Alexandria theological seminary, much against the will of his father, Col. Wm. Polk, who being of a military race desired that his son should embrace the profession of arms. Of the "White House" he writes at that time, "The buildings and grounds about the president's house seem going to destruction, and some of the rooms, one especially has never been furnished. It is a broad, long room and looks more like parsimony in the government than anything I have ever seen." We wonder if this was the room the furnishing of which cost Mr. Van Buren the loss of his reëlection. *Vide* the speech of Gold-spoon Ogle of that campaign.

In 1831 he made a European trip for his health and his notes, letters, and observations are interesting and instructive.

From his remarks on church customs, high ritual was not to his taste, but he left England before "tractarianism" began its campaign. In remarking on the neatness and comfort of the English homes, he breaks out "and when I think of our own vast plantations, with our dirty, careless, thriftless negro population, I could and do wish that we were thoroughly quit of them."

The old plantation life is beautifully, touchingly described and the relation of master and slave painted in fine but fair colors. We read and envy that old life, anachronism as it was. Bishop Polk stood there as bishop, pastor, master of half a thousand and we can imagine the impressiveness of their religious services and devotions. The records of those times left in the doctor's hands are full and we are only sorry that more is not given us.

At the same time that his desire for being quit of slavery was expressed, his desire for a *southern* university was conceived (in England, 1831). In 1854, "He fully recognized the necessity of giving a special direction to the course of study to be pursued by men intended for a particular profession." Another reason is added among many. "But it was to the south he looked for the maintenance of a true conservatism [against the upheavals produced by the foreign immigration in the north] not

only within its own borders but throughout the country. He despised, heartily enough, a mere aristocracy of wealth, which might be almost as injurious to the true interests of the commonwealth as mob-law established under the name of universal suffrage; but he held that an aristocratic element of some sort is necessary to the stability of society; and in the institutions of the south he believed that such an element had been providentially furnished. It was necessary, however, that the ruling classes of the south should be worthy of the place in the destinies of their country to which he believed that Providence had called them."

It is easy to see how incompatible these sentiments would be with northern feeling. Though in every important church question up to the active steps in starting his university he had consulted Bishop McIlvaine, on *this* point the bishop conspicuously ignores him, dropping the friend of his youth, for the bishops of the southern, not border, states. Had his intentions been catholic and not expressly sectional in his scheme we may be sure that that holy father would have commended and assisted in the enterprise. It is not easy to say how much the action of the southern bishops in the general convention of 1856 on the subject of this university scheme of Polk's had to do with preparing the southern mind for a separation from the union, and a question not out of place is, was an organization for an independent church prepared there and then, and matured in that of 1859? Secession did not find them unprepared.

The opposition of the church north to this university scheme was manifold. 1. The church had no necessity for two sets of clergy, the one educated especially in concord with the southern socio-domestic holdings. 2. There were struggling institutions existing, and struggling to exist, which needed the support of the whole country. 3. They felt that it was to be a propaganda of sectionalism.

This opposition of northern feeling cannot be called a "narrow prejudice." That the north was correct in its estimate was duly proven by the estimate placed on it by the union men of Tennessee, who, it is said, destroyed the university buildings at the beginning of the war. Telfair Hodgson says, p. 236, speaking of the destruction of the buildings during the war and on the breaking of the cornerstone, "It was a glorious vision, that faded, however, in war, defeat and death. There were two glimpses of it. The first we can understand. The second is shrouded in mystery that will be disclosed only at the last day." No mystery at all, Mr. Hodgson. It was built as the exponent of a principle which every true patriot condemned; it challenged the anger of every unionist, through the noisy proclamation of its sectionalism; the death that followed it, which, if you please, grew out of it, was a very natural sequence of events.

In committee three names were proposed for the university—University of the South, The Church University, and the University of Sewanee. With true southern courage and not flinching from the charge of sectionalism, but accepting it to the full, they chose The University of the South. Just think of our dubbing an institution The University of the North. Although we deprecate the name, the present institution is on a much healthier basis and has we believe the sympathy of the American people generally; in fact has a better *corner stone*, not founded on slavery.

Two things are conspicuously absent in the "Life": a word from the bishop against secession, and a word for the union. A letter from a brother bishop [presumably McIlvaine, whom he had lately ignored] had the following effect. On the ground of his wrongs in the burning of his house at Sewanee, on the university grounds, he felt that "every man who recognized the first law of nature was bound to resist with whatever powers of head or hand he had received." "This impression was indefinitely strengthened by a letter which he received shortly afterward from a *northern bishop, now dead* [*italics* ours], whom he had esteemed with great affection. On his countenance one

might see from time to time the play of every best expression that belongs to human emotion; after the reading of that letter it wore the sublimity of righteous wrath. Beyond all doubt the letter of Bishop [Doctor, why suppress the name, his soul won't thank you for it] helped to form the after-thoughts and to influence the after-course of Bishop Polk. It would be strange if it had not done so. The reader will remember how he had clung to his belief in the influence of the church to mollify the rising passions of the sections."

The pleasantest part of the book outside of the domestic *contes* is the bishop's war record. We don't remember the "unsparing condemnation" of the northern press at the bishop's "buckling the sword over the gown." It was deprecated, so it was south, but we never could see any *inconsistency* in it. If the cause demanded it, it could be no more harm in a priest wielding the sword of the Lord and of Gideon than in your and my doing it. In some cases *healing* can only come by excision. Why shouldn't a priest heal as well as a layman? There is no question that Mr. Davis showed excellent judgment in selecting him for his office and he violated no vow in accepting the duty placed on him. Everything pointed to him as the fitting person. Of the leading family of the southwest, of a continuous military extraction, of an early military education and training, ripened as to powers of organization by the work of a bishop for twenty years on a frontier, better known than probably any other man over Tennessee, Mississippi, Louisiana, Texas, and Alabama, of great beauty and majesty of person, born and trained to command, he was clearly the man for the place. He, in our opinion very properly took it, till Albert Sidney Johnston should arrive, then *en route* overland. Only four priestly functions did he perform while in arms. One at the death-bed of Maj. Ed. Butler (but in a more detailed account of this in another place, no mention is made of administering the sacrament, simply praying with the "passing"), the marriage of General Morgan, the baptisms of Generals Hood and Joe Johnston.

In the second volume Kentucky's attempted neutrality is discussed. The doctor says it embarrassed the Confederates. They "were hampered by the doctrine of states' rights." Later in the war it is known they got over this when Mr. Davis "came down" on the governor of Georgia for a mild suggestion of the doctrine. When Polk occupied Columbus, President Davis justified it on the doctrine that "the necessity justifies the action," quite different you see from the end justifying the means. By the way what a nice fat position Kentucky would have held had both sections respected her wished-for neutrality, and then let her ally herself to her choice after the contestants had exhausted themselves of blood and means. The author while seeing the unquestionable value of the doctrine of states' rights shows how it weakened the confederate government in the general defense. We don't see that the value is proven. But then, like some other invariable rules, the confederacy "plowed round it," to use one of Mr. Lincoln's phrases. Bragg in Kentucky in September, 1862, established the true doctrine of states' rights. [*If you are for secession and the Montgomery pact we admit your state's rights and leave your government machinery intact, if you are for the union we establish within you a new machinery holding contrary sentiments and then your state will be still right.*]

The evacuation of Columbus is strongly condemned, and with reason. It could have resisted a long siege to the exhausting of much northern resource, and would have given valuable time to southern organization, arming, and defense. Against the wish of Polk, Beauregard acted on the report of two inspectors unlike Caleb and Joshua.

Polk is defended successfully against Colonel Roman's charge of impeding Hardee's march in the movement from Corinth against Pittsburg Landing. After all the blame

that may fall on Bragg for his dilatory march here, it would appear to rest ultimately on bad organization. Too much had been placed or taken upon his shoulders. He was not only Johnston's chief of staff, whose duties must have occupied a portion of his time, but his corps was twice and three times as large as those of his coadjutors, and was made up of the greenest troops, mostly recruits unused to marching, and the worst roads over which to march were given him.

A striking thing in this history is that scarcely a single coalescing of separated troops was successful in proper time. Sometimes one unforeseen element would prevent, then another. Now it was bad roads or a swollen stream, again a mistaken order. Now a dilatory commander, then an errant guide. Now exhausted men separated from their supplies, then a sleepy corps commander who could not be found. The lesson is that he who would concentrate troops for a simultaneous work should do his sleeping two days before, and then be ubiquitous. Rest and success are out of the question.

General Polk renders a glowing, graceful, and true eulogy to Albert Sidney Johnston, who graduated from West Point number eight in the class of 1826, while Polk graduated in the class of 1827, number eight also. They had been lifelong friends and mutual admirers. Johnston's character could be in no way heightened by anything we could say, but our last reminiscence of him is painful. In his capacity of department commander he had used our humble services in the protection of the forts in San Francisco harbor against the rumored attempt at their occupation by the Knights of the Golden Circle. We were delighted with his and his chief engineer, Gilmer's conduct. None could have been more loyal to their trust. His resignation was unknown to us, and so on his being relieved by General Sumner there was some indignation felt at the want of confidence shown by the administration. We went to his hotel to pay him our parting compliments, and in our bungling way expressed the hope that we might yet fight under him in the impending war. Imagine how our heart fell when he said, "I hope wherever we may meet we may be found doing our duty." The sentiment was noble enough, if not new, but we felt he was gone to us. On an occasion before leaving San Francisco he said his allegiance was to the state of Texas, to which he owed all he was. We couldn't but think he owed something to Indiana, which bore more of the expense of his education and of his daily wage than had Texas.

It is not clear what the author thinks about the battle of Shiloh. General Polk speaks of it as a drawn-battle, while the author gives no reason for Beauregard ordering a withdrawal of the confederate force. He bears high testimony to Bragg's qualifications as an organizer, and his magnetism in instilling new courage into his army after the battle of Shiloh. General Polk is well defended against Bragg's attempt to throw the failure of his Kentucky advance on P.'s shoulders. We can account for Bragg's supineness in this September and October campaign only by his habit of demordicating incisorially in salience of his capacity to masticate molarily. To establish a pseudo governor and state government in the capitol, and at the same time to conduct a campaign involving all the problems of grand strategy was entirely too big a mouthful. He preferred politics and lost the campaign. To legitimize states' rights by trickery he grasped at the shadow and lost the bone.

Still it is not made clear why Bragg "with the advice of his generals" should have left Kentucky. His force surpassed Buell's. He claimed a victory at Perryville. The author' explanation for the retreat (or withdrawal) of the victorious confederates from Perryville is not lucid; neither are we told why Bragg did not choose position and force battle at Harrodsburg, Danville or Bryantsville. We cannot but think, knowing Polk's character as a fighter and his conviction that a victory over Thomas was needed to give new heart to the confederacy.—that had he believed victory possible,

he would have accepted Kirby Smith's proposal, would have turned about and given battle. He would not have allowed Bragg's order sending them to Knoxville, to stand in the way of a probable victory.

One is struck at this late day with the question, "Why was Rosecrans not successfully invested in Chattanooga at first? The attempted investment was soon broken by reinforcements forwarded to Rosecrans' relief. Why was Bragg not reinforced? The confederacy had the men to spare, and Rosecrans was at an extremity. It should not have been as hard to throw men from the confederate centres as from the union circumference. Lee was detachable (Lee's letter of Oct. 26, 1863, to Polk is a very milk and water affair). Mr. Davis' infatuation for Bragg was a part of his character, not an unamiable quality, properly tempered. Like Grant he kept his confidence fast in the friends of his youth. This was sometimes injudicious in war times, but it may be even worse, as in the Davis-Johnston differences, to indulge in our dislikes of people when our country demands their services. Again, we may have the right to let our friends victimize *us*, but not our *country*.

We think the author is guilty of a neglect to his general reader in not giving Hill's explanation of why he could not be found by Polk's messengers on the night of Sept. 19-20, at the battle of Chickamauga.

The narrative ends substantially with the death of General Polk at Pine Mountain. How many futile wishes we indulge in in this world. We would give much to know what made the great man, for great man he certainly was, stop on the top of that mountain, face round, fold his hands upon his breast, gaze a moment on the grandeur of the spectacle before him, and in an instant pass from this life to the next. It could not have been bravado, his high christian nature was above such low conceptions.

Duty to his family and to the cause, combined with a fair estimate of his own value to them, would have checked unnecessary exposure. Did he think that an example of courage was needed by his men? Did he hope to see some weakness in the union plan? Had, on his approach, the wonderfully grand scene of struggling manhood spread out below him, so appealed to his mind, so receptive of the striking in nature, as to force upon him the desire to have a last look? Alas! it was a last look.

JNO. HAMILTON, Col. U. S. A.

Isabella of Castile.*

When the writer asked Marshal Serrano who he deemed the two most important rulers of Spain he promptly replied Queen Isabella and her grandson Charles V. Isabella certainly accomplished much in improving the administration of her realm, encouraging art and literature, and in curbing the crafty and stern measures of her husband Ferdinand. Though the life and soul of the war waged against the Moors, in which she personally took part, wearing armor which the writer has seen in Spain, she was opposed to the cruelty which was then the established policy toward that people. The sincerity of her piety and strength of her religious convictions led her more than once into errors of state policy which have never since been repaired, and into more than one act which offends the present age; her efforts for the introduction of the Inquisition into Castile and for the expulsion of the Jews, are evidences of what can only be called her bigotry. The encouragement she gave to Columbus is her strongest claim to remembrance among Americans. A happy intuition led the young queen when all others had heard with incredulity the scheme of the Italian "Stranger with the Threadbare Cloak," to recall the disappointed wanderer to her

* *Isabella of Castile.* By Major General O. O. Howard, U. S. A. Funk & Wagnalls' Company, New York, 1894.

presence with the words, "I will assume the undertaking for my own crown of Castile and am ready to pawn my jewels to defray the expenses of it, if the funds in the treasury should be found inadequate." The Squadron with which "that famous land" was discovered, or re-discovered,—for Paul Du Chaillu asserts that he has recently found in Denmark five distinct descriptions of journeys of the Vikings to America,—was equipped at Isabella's expense. She strongly opposed the reduction of the Indians to slavery, and when a cargo of these captives were sent to Spain she ordered their return to their own country. The masculine intellect, the feminine charms, and the virtues and influence of Isabella, like those of the present Queen Regent, greatly improved the moral tone of her kingdom, and made it the "nursery of virtue and of generous ambition." Her reign was rendered famous by three illustrious men, Cardinal Ximenes, the consummate statesman; Christopher Columbus, the most successful navigator of all the ages; and Gonsalvo of Cordova—*El gran Capitan*—one of the seven chiefs whom Sir William Temple, in his Essay on Heroic Virtue, says deserved without wearing a crown. Isabella of Castile has been a favorite theme for historians of all subsequent times,—among whom our own Irving and Prescott take high rank,—and the affection in which her subjects held her person is still strongly cherished throughout Spain for her memory.

In the admirable biography before us General Howard has judiciously delineated the Spanish queen's character, and thus rendered a commendable service to his contemporaries. We cannot, however, avoid expressing regret with the unsatisfactory map of Spain; at the omission of Washington Irving's name from the list of authorities consulted, for he is frequently quoted, and at the absence of an index, which would have very greatly enhanced the value of this entertaining 12mo volume. The numerous text illustrations by Carter are very artistic and attractive.

JAS. GRANT WILSON.

Dictionary of Electrical Words.*

The generally recognized necessity that has existed for a book defining electrical terms is clearly shown by the great sale Houston's "Dictionary of Electrical Words, Terms and Phrases" has enjoyed from the very first, and which has caused it to reach a third edition within the space of a few years. As an encyclopædic dictionary of electrical science and its numberless applications, the work has been assigned a definite rank, and numbered among those that should find a place on the reference shelves of every library and in every collection that aims to include at least the few best and indispensable books.

The third edition, which has just appeared from the press, contains an addition of about 20 per cent. of matter and brings the work down to the year 1894. During the last two years many new electrical words and terms have been introduced, particularly in the classes relating to scientific nomenclature and alternating currents, all of which will be found in this latest edition of the Dictionary. Among the former is included the result of the work of the World's Fair International Electrical Congress and of the Committee on Units and Standards of the American Institute of Electrical Engineers, while proposed nomenclature from less authoritative sources, but nevertheless likely to be encountered by the reader, have not been neglected. The comparatively recent development in the field of electrical transmission of power, exemplified by the great Niagara plant among others, has brought forward the subject of multiphased alternating currents, the rotary magnetic field and many phenomena new to industrial electri-

* *Dictionary of Electrical Words, Terms and Phrases.* By Edwin J. Houston, Ph. D. (Princeton.) Third edition, greatly enlarged. New York: The W. J. Johnston Company, Ltd., 253 Broadway. 1894. 669 double column octavo pages, 582 illustrations. Price, $5.00.

city, and which as yet are scarcely to be met with in electrical book literature. All of these receive careful attention in the latest edition, not by mere definition alone, but also, in accordance with the plan of the work, with the accompaniment of clear and easily comprehended statements of the principles of science involved. Apropos of this rapid introduction of new terms necessitated by the growth of electrical science, the author states in the preface that had this fact been known in time, it might have been better to have developed the additional matter throughout the text of the second edition rather than place it at the end of the present book as an appendix.

In this we agree with him and believe the work will become more available for ready reference, if this idea be carried out in a fourth edition. The author further states that he contemplates re-writing and rearranging the entire volume in the event of another edition being called for—as it certainly will be.

Some idea of the scope of this important work and of the immense amount of labor involved in it may be formed when it is stated that the Dictionary includes upward of 6000 distinct words, terms or phrases, and 582 illustrations, all of which, with a few exceptions, were drawn especially for the work. Each of the great classes or divisions of electrical investigation or utilization comes under careful and exhaustive treatment, and while close attention is given to the more settled and hackneyed phraseology of the older branches of work, the newer words and the novel departments they belong to are not less thoroughly handled. Every source of information has been referred to, and while libraries have been ransacked, the notebook of the laboratory and the catalogue of the wareroom have not been neglected.

The scheme of treatment is as follows:

First, the words, terms and phrases are invariably followed by a short, concise definition, giving the sense in which they are correctly employed; second, a general statement then follows of the principles of electrical science on which the definition is founded; third, when, from the complexity of the apparatus or from other considerations, it has been thought desirable to do so, an illustration or diagram of the apparatus is given; fourth, to facilitate study, an elaborate system of cross-references has been adopted, so that it is easy to find the definitions, as the words and aliases are readily detected and traced.

In applying these rules great care has been exercised to secure clearness, to the end that while the definitions and explanations shall be satisfactory to the expert electrician, they shall also be simple and intelligible to those who have no training at all in electricity or are novices in the art. This is a work of some difficulty, and it is fortunate that the task fell to Professor Houston, in whom the expository faculty is most happily united with a wide and exact knowledge of both the practical and theoretical sides of the subject. That he has successfully accomplished his purpose is the verdict implied in the remarkable unanimity of praise with which the result of his labors has everywhere been received—by reviewers, by the electrical profession, and by the general public. No one will regret the detail into which he goes, but, on the contrary, in view of the fact that so many of his definitions are new, and are not to be found elsewhere, in any form, every one will be glad that the latest terms in vogue in the most recent applications come in for elaborate, yet "popular" treatment.

The plan of the Dictionary is such as to bring it within the range of the entire community. In this electrical age such a work is an actual necessity to the general public to enable them intelligently to use their mother tongue, now becoming so thoroughly imbued with electrical words, terms and phrases, and which are so constantly met with in the periodical literature of the day, and in conversation respecting the manifold applications of electricity encountered in daily life. To the editor or journalist; to the intelligent reader of scientific periodicals, as well as of the newspapers

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and magazines ; to the school teacher, the college professor, the lawyer, the doctor, the professional man generally, it supplies a work of reference no less indispensable than the general encyclopædia. To students of general electricity and of electrical engineering, and to those actually engaged in the electrical industries, it is not only an aid but an absolute necessity.

The Dictionary is a handsome book. The typography is excellent, being large and bold, and so arranged that each word catches the eye at once by standing out in sharp relief from the page. The volume is convenient in size, and the binding and paper are as perfect as can be made. In a word, the mechanical production of the book has been given special attention, and while no cost has been thus spared, it is yet placed within the means of all. We cordially recommend the work to our readers and look forward with interest to the appearance of a fourth edition.

From Headquarters.*

Short stories, with a serious purpose underlying their construction, are sufficiently uncommon in these days of aimless fiction to attract attention. And, therefore, this book deserves more than the passing notice, want of time and space compel us to give to it.

The author is an officer (so we should judge, although his rank does not appear on the title page) of the Massachusetts Volunteer Militia and his "purpose" peeps out between the lines of his clever little book: it is to remind those who scoff at citizen-soldiers that the day of the train-band has passed and that of the "Commonwealth's Strong Right Arm" is with us: that the modern militiaman devotes much time, money and energy to the study of the Art of War in conjunction with the prosaic pursuits of Peace, and that he is only second in soldierly efficiency to his friend and colleague of the army. This is set forth gracefully and not at all aggressively; the few references to the fact being neatly combined with the frame-work of several tales of the war-time and since—showing that medals of honor are not confined to the tented field and that heroism may be found in a Boston armory.

These stories indicate the possession of much literary skill and we can hardly believe them the work of an amateur. They remind us sometimes of Kipling—at his cleanest; again of John Strange Winter's descriptions of mess-table chat and garrison life; and anon of King, in his military details and local color; yet the elements are well blended and the effect is strong. We opened the book one evening, to "skim" over its contents; we did not close it—nor our eyes in slumber—until we had read every word.

T. F. R.

General Johnston.†

A subaltern recently asked "who was the Northern commander at Sumter when South Carolina fired the first gun." Let us realize there is a new generation needy of information. The artist who will construct the whole mosaic of our war history is probably yet unborn, but innumerable preliminary studies from varying points of view will some day catch the scrutiny of a critical eye, to embellish a masterpiece, or to fall under foot as rubbish.

The eminent publishers of the "Great Commander" series are timely in the spread of their pictures, and have wisely selected the outlooks for their easel. Their appointed limners work with faculties restricted to their environment. Happily for the coming historian this is so. Differing aspects will broaden his comprehension while we who

* *From Headquarters.* Odd Tales Picked up in the Volunteer Service. By James Albert Frye. Boston: Estes & Lauriat. 1893.

† *General Johnston.—Great Commander Series.* By Robert M. Hughes. D. Appleton & Co. New York.

view this panorama of distinguished chiefs should be pleased with the varying background, fore-ground, and illuminants impacted with the personality of each painter.

Preëminently so is thus distinguished the canvas from the hands of the biographer of General Joseph Eggleston Johnston, it is aglow with the color of the lost cause. The light of Southern skies illumes the whole figure of his hero, and is possibly in places rather intense for Northern eyes. Yet the effort to judiciously dispose so that shadows may not distort, only truly portray, evokes satisfaction and sympathy. The mere technic betrays a "prentice and unpracticed" hand, but not detractingly so from the lofty subject. Now and then the grotesque slightly jars as when the retarded march of the raw Confederate infantry hastening from the valley to the first Bull Run, is apologetically accounted for with the remarks "that they were still Southern gentlemen with baggage and body servant." The facts and figures given show great care and wide research. The strength of opposing commands, stated argumentatively as they are, are in most cases fairly conclusive, yet in some fail to settle what are yet, and likely always will be, vexed questions. One error of date is noticed as when the battle of Stone River is placed in the first two days of 63, and the day before, bloodiest of all, omitted.

Auspicious from birth, of Scotch ancestry or more remotely and fancifully a gallic Jeanville, from a father an officer in the Revolution, and maternally a grand-nephew of Patrick Henry, General Johnston was a Virginian of the Virginians when ability could command the favoring influence of this favorite State. Graduating in 1829, 13th in a class of 46, of which Robert E. Lee and himself were the only representatives of his beloved Virginia, he was a lieutenant 9 years in the 4th Artillery, with service and two wounds in the Seminole war. Transferred in '46 to the Topographical Engineers, '47 found him a captain under Scott, at the siege of Vera Cruz and shortly after a lieut.-colonel of Voltigeurs, which were organized for the war. Reconnoitring under the walls of Cerro Gordo, he was again twice wounded, however not so severely as to prevent him from distinguishing himself at the assault on Churubusco, and again at Molino del Rey. Relegated at the close of the war to the rank of captain of Topographical Engineers with the brevet of colonel, professional service in Texas and on Western river improvements employed him until in '55, he was commissioned a lieut.-colonel of a new cavalry regiment. In '58 he was inspector to the Albert Sidney Johnston expedition to Utah. General Jessup's death in the summer of 1860, brought him the appointment of Quartermaster General, after a vigorous competition for the place with R. E. Lee, A. S. Johnston and Charles F. Smith.

General Johnston had thus reached preëminence above his compeers of the old army, when the Rebellion came to call out latent powers of which he was probably as unconscious as any of his coming comrades or contestants. He had now ripened naturally vigorous, intellectual and physical powers with 54 years of arduous development.

Promptly on the secession of Virginia he tendered to Secretary Floyd his resignation with the single remark: "The feelings which impel me to this act are I believe understood by the Secretary."

Let us respect the solemn moment of a superior soul turning from the proud career of an ordinary lifetime to plunge into the unknown. Too cold is the head that cannot feel the fire of the heart. Summoned at once to the councils of the greatest chiefs. He was intrusted with the most important commands. He enrolled and organized the gathering forces about Harper's Ferry and Winchester, and with them outwitted and evaded his senile antagonist, until marshalled at Bull Run to the assistance of Beauregard he delivered the staggering blow to the Northern army. Selected from all rivals, to him was given the task of confronting McClelland in the spring of '63, on the Peninsula, holding him at bay at Yorktown, Williamsburgh, in the manœuvres

along the Chickahominy, and their culmination in the pitched battle at Seven Pines, until at its close a grievous wound compelled him to relinquish command to his great friend and rival in fame, General Lee.

We epitomize these events to point out and emphasize the preparatory training which educated General Joseph Johnston for his mighty contest in the West upon which principally his fame rests.

The military student who is familiar with his magnificent strategic and tactical generalship which illumines that long line from the Tennessee to Atlanta, cannot fail to follow with pleasure in this biography his preliminary labors of which less is known. These labors were not professional alone, they were personal and had he not been a strong man would have engulfed him. The personal began with the slenderest thread in his career as a general and strengthened to be of pervading importance, even political. Inextricably interwoven with the story of General Pemberton at Vicksburg and General Bragg at Chickamauga, is the story of General Johnston's estrangement from Mr. Jefferson Davis. Sent in '63 to the supervision of both of their armies he was powerless to compel the one to evacuate and the other to recall weakening detachments. Our author makes it plain that the far wiser forecasts and judgments of the General were brought to naught by the meddlesome distrust of his civic chief. This even leads him to the historic conjecture, not altogether vain, as to what might have been had Johnston on the recovery from his wound at Seven Pines been returned to the command of the Army of Northern Virginia and Lee been sent West with the confidence and full support he ever held of the whole Confederacy and exclaims, "then might Gettysburg never have been and Vicksburg not have fallen."

Heedless is it to further allude to his campaigns in Georgia or the Carolinas where according to his means he held his own grandly against his great antagonist to whom he at last surrendered. The study of either reflects military renown on the other. Both take rank among the most accomplished soldiers, and both we may observe exhibited that extreme sensitiveness to the slights of authority which their vocation is supposed peculiarly to foster, the one at the onset of his career with his President, the other at its close with our great War Secretary. Johnston fairly and justly is placed amid the galaxy of great American commanders. His deeds came short of triumphant conclusions but never were failures. His advocate has to defend him from aspersions at every phase of his generalship, but he has done it in a liberal spirit and we think convincingly.

It is pleasing to know that with such superior abilities there was coupled pureness of life. He survived to the comforts of a ripe old age, and the veneration of comrades.

We commend this life of a soldier to soldiers for its professional worth.

G. S. CARPENTER,
Major 14th Infantry.

Interior Ballistics.*

The complex problem of determining, so far as possible, the effects of the firing of explosives in guns has engaged the efforts of some of the best minds in this and other countries. The author of this work has given his attention to this problem for years as an investigator, computer and instructor.

His successes in each of these capacities have been embodied in his present work with a marked degree of ability.

He presents clearly what is known or accepted in the theory of this subject; he elucidates statements and deductions by appropriate problems and he has appreciated and made less difficult most of the knotty points of this subject. It is not the least

**Interior Ballistics.* With a Short Treatment of the More Common High Explosives. By Lieut. J. H. Glennon, U. S. Navy.

of the merits of this book that it presents clearly to the student the empirical character of his final working formulæ which give the velocity of the projectile at any point of its travel along the bore and the corresponding pressures.

These formulæ are undoubtedly the best we have to-day for the solution of the practical problems to which they refer and too much credit cannot be given to their author for the beautiful way in which he has constructed them.

To those who are already acquainted with the subject of which this little book treats, the name of Lieut. Glennon will arouse at once a feeling of interest and confidence, which will be but heightened by the close study of what is contained in this present work of his. Further utterances of the writer will be welcomed by all interested in the study of Interior Ballistics.

Science in the Stable.*

This little monograph is a protest against "stable furniture" and a plea for a return to the teachings of nature in the treatment of that noblest of beasts, the horse. The customs of civilized life have undoubtedly been important factors in depreciating the powers of endurance of the gentleman's horse, and his capacity for resisting so-called hardships; he is too much "coddled," too much blanketed, too carefully stabled, too little worked. The remedy our author suggests is, fresh air; he says, "When we inquire into the natural history of the horse, we find that he is preëminently an out-door animal. In his wild state he is never housed. Night and day he is in the open air. Rain or shine, cold or hot, in storms of all degrees, he has no protection"; and therefore if we expect to get the most out of him we should "place him as much as possible in his natural environment." Our author contends that the necessity for shoeing is the outcome of artificial methods of horse keeping and holds that if horses are properly stabled they will not require to be shod. This again introduces the oft discussed question of to shoe or not to shoe, which the War Department recently settled, so far at least as the army is concerned, by peremptorily ordering all public animals to be shod; and recalls to mind an interesting discussion of this subject in which a well-known cavalry officer remarked, "I shoe a horse when he needs it, and don't when he don't."

J. V. R. H.

The Diary of a Cavalry Officer in the Peninsular and Waterloo Campaigns, 1809-1815.†

Colonel William Tomkinson began his military career as cornet of the 16th Light Dragoons in 1808, and in about a year his regiment went to the Peninsula. He served in all the English operations of that theatre of war except the campaign of Sir John Moore, and he was a captain at Waterloo. He was wounded four times in one of his first affairs, but thereafter, in a most active field of service, he received no hurt. He was commended for gallantry on several occasions, and altogether performed a very honorable part wherever he served. But however fine a record he may have made as a soldier or sportsman he does not appear to have been a success at writing a book. He probably had not the slightest intention of ever publishing the story of his career, and to publish it now, "almost exactly as it was written," seems unjust to the author. The absence of editorial work is evident on nearly every page, and detracts a great deal from the attractiveness of the plain and simple tale of a gallant soldier. The reader of books as well as he who seeks for knowledge of the military history of Napoleonic wars will probably turn in preference to the more brilliant narratives of Marbot, Coignet or Parquin.

E. S.

* *Science in the Stable.* By Jacob R. Ludlow, M. D., Bvt. Lt. Col., U. S. A.

† *The Diary of a Cavalry Officer in the Peninsular and Waterloo Campaigns, 1809-1815.* By the late Lieut. Col. William Tomkinson, 16th Light Dragoons. Macmillan & Co. New York.

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Extract from Minutes of a stated meeting of the Executive Council, Military Service Institution, held at Governor's Island, N. Y. H., July 13th, 1894, Major General Howard in the chair.

On motion by Gen. Rodenbough, seconded by Gen. Abbot, the following Resolutions were unanimously adopted:

Whereas, the Executive Council has received intelligence of the death at Newport, R. I., on the eleventh day of July 1894, of

Brevet Major-General

James Barnet Fry,

Colonel Adjutant-General's Department, U. S. A.

(Retired)

formerly a Vice-President, a Life Member and one of the Founders of The Military Service Institution of the United States; therefore be it

Resolved, that the members of the Executive Council hereby desire to place upon record their grateful sense of General Fry's important, untiring and unselfish service in the organization and development of The Military Service Institution; and of his valuable aid in promoting the interests of the military service generally, by able contributions to the Journal and by successful efforts to increase the Membership.

Resolved, that by the death of General Fry the Country has lost a tried and distinguished soldier, the Army a sincere friend and the cause of Military Education an able advocate.

Resolved, that this expression of regard and esteem for our late associate be printed in the Journal and that a copy, suitably engrossed and signed by the Officers of the Institution and Members of the Council, be transmitted to the family of the deceased.

The Military Service Institution.

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Resident Vice-Presidents.

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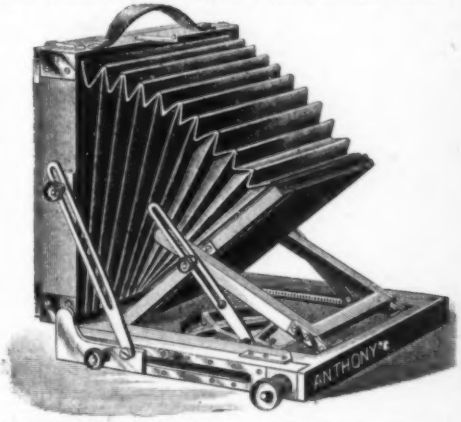

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THE ORDNANCE DEPARTMENT.

By Major C. E. DUTTON, Ordnance Dept., U. S. A.

THE Ordnance Department was organized as a distinct branch of our military establishment by an act of Congress approved May 14, 1812. The duty of providing military stores for the army and militia had devolved prior to that time upon a purveyor of public supplies acting under the direction of the Secretary of War. Everything except small arms was purchased, mainly by contract, and the Secretary personally supervised the contracts. The examination of accounts now performed in the staff bureau was made in the office of an accountant of the War Department. The duties of supplying ordnance material vested in the Secretary himself. When an addition of 6000 men was made to the army in 1808 these duties became excessive and burdensome to the Secretary, but no relief was granted until the war with Great Britain was impending, when bills were passed establishing a Quartermaster and an Ordnance Department. An act of May 14, 1812, provided for a Commissary General of Ordnance, an assistant commissary general, four deputy commissaries, and as many assistant deputy commissaries as the President might think necessary not exceeding eight.

An act approved February 5, 1815, "For the better regulation of the Ordnance Department," provided a body of officers, consisting of one colonel, one lieutenant colonel, two majors, ten captains, and ten of each of first, second and third lieutenants. As this act, so far as relates to the Department itself, independently of its personnel, is regarded as its organic law, and, with only minor modifications by more recent acts, is still in force, it may be well to indicate briefly its most important features. It authorized the chief officer of the new department, "under the direction of the Secretary for the Department of War," to enlist artisans and laborers; to direct the inspection and proof of all cannon and small arms; to direct the construction of gun carriages, equipments, implements, and ammunition; to make estimates and contracts for, and purchases of ordnance supplies and stores, and to issue them to the army; to exact from armories and arsenals quarterly returns of property and to receive from all responsible officers reports of damages to ordnance material; to establish ordnance depots; to prepare regulations for the government of the Ordnance Department and forms of returns and reports. The public armories and arsenals were placed under his direction, and the duty of arming and equipping the militia from the permanent appropriation of $200,000 per annum provided by the law of April 23, 1808, devolved upon the new department.

The colonel and chief of the new corps was Decius Wadsworth and the lieutenant colonel was George Bomford, both officers of ability and distinc-

tion. Little is known of the state of this service in the six years following the war with England beyond what appears in the routine records. These records suffice to show that great improvements were effected in modes of administration and a system introduced for securing promptness, efficiency, economy and responsibility to a degree which was before unknown and which in its main features has lasted down to the present time. Whoever reads the Ordnance regulations of 1818 will be surprised to see how little rather than how much they differ from those now in force.

In the reduction of the army in 1821, the Ordnance Corps ceased to exist, the majority of its officers being re-commissioned in the artillery. But the Ordnance *Department* remained. Its duties were performed by officers detailed from the artillery. Bomford, who had been the lieutenant colonel of the corps and was made lieutenant colonel of the 1st Artillery, became the head of the Department. The law provided for four supernumerary captains of artillery who should be available for ordnance duty, and these were so assigned. Their details were practically permanent, though not necessarily so; their continuance depending upon the pleasure of the Secretary of War. All other officers whose services might be required were to be detailed for the term of one year from the artillery.

Whatever may be the merits, under favorable conditions, of an ordnance service performed by officers detailed from the line, it is now apparent that they could not be realized under the law of 1821. The periods of detail were much too short to enable them to become proficient, and the little experience they might have gained was lost to the Ordnance service by the return of the officers to their regiments. Then, as now, the duties required men of special and long experience, and once secured they could not be easily spared. The service degenerated, and after the retirement of Mr. Calhoun in 1825 his successors urged with increasing pressure the reëstablishment of the Ordnance Corps. In 1832 Congress yielded and passed the bill. It provides for one colonel, one lieutenant colonel, two majors and ten captains, to be selected from the artillery. Bomford was made chief of the corps. He was a man of vigor and great intelligence, a capable organizer and well qualified to renovate and build up an important administrative bureau. He brought to his new office certain qualifications which are most essential to it; above all, the faculty of impressing himself strongly upon public men in Congress and at the head of administrations. His social standing and connections were eminent; his address impressive, yet pleasing. His official papers in particular were models of reserve force, lucid argument, and fluent style. The personnel of the new corps was carefully selected. All of them had excellent records. Three of them, Lieut. Colonel George Talcott, Major H. K. Craig, and Captain R. L. Baker, had been supernumerary captains of artillery during the consolidation period, serving continuously in the Ordnance. One name, however, was conspicuous by its absence. Captain William Wade, who had been one of the supernumerary captains, had served as an Ordnance officer since 1812, and with conspicuous merit. In the natural course of appointments it was expected that he would be made the second major; but the place was given to Captain and Brevet Lieutenant Colonel William J. Worth. Wade, though offered a cap-

taincy, considered himself overslaughed, and resigned from the army.* If he was wronged, he secured a noble revenge. For the time came when the department was in urgent need of just such services as Wade was, of all men, most capable of rendering. He gave them loyally, with lasting honor to himself, and with great advantage to the government. Among the captains, the first place in respect to ability must be conceded to Alfred Mordecai. He rose rapidly by force of merit to a fame less brilliant, but not less solid than Rodman's. His memory is entitled in a peculiar degree to the care of army historians, for his work was such as appeals to technical and professional men rather than to the multitude. His contributions came, not in the shape of a few large nuggets, but in a steady stream of gold dust sustained for many years and far outweighing the nuggets in the end. The value of his work consisted in its accuracy, its systematic character, and its immediate utility, and still more in the subtle, potent way in which the spirit of it pervaded almost insensibly the entire corps.

Mordecai was not the only one whose merit was greater than his popular fame. Of some of them I knew too little to speak, and all had gone from the corps when I entered it. But I well remember the accounts of them given by those who had served under them and whose own conduct was the best illustration of the discipline and training they had learned to emulate. Their abilities were chiefly executive. They may perhaps be gauged by the generally admitted fact that the armories and principal arsenals became the model workshops of the country.

The field open to the new corps was a broad one. The stagnation of the preceding decade had pervaded the entire army, and most of all the Ordnance service. It had caused, not indeed retrogression, but a lack of progress. The Indian wars of the thirties once more awakened the interest of Congress in the army and the army's interest in itself. The equipment of the new regiment of dragoons, the renovation of the field-guns and their mounting, the improvement of cast iron with a view to heavier calibres in the fortresses, the important changes in their carriages, experiments with breech-loading small arms, all engaged attention. Although progress was made, the full fruition of that progress did not become manifest until ten to sixteen years later, for the problems were difficult and the general state of the arts and sciences was not at that time such as to render a very rapid progress possible.

By an act approved July 5, 1838, the President was authorized to add to the Ordnance Department two majors and to transfer to it from the artillery ten first lieutenants and ten second lieutenants. A supplementary act approved two days later, July 7, 1838, limited the number of lieutenants to be transferred to twelve. Among the new names of the corps we find those of Captains Maynadier and Thornton and Lieutenants Whitely, John F. Lee, Hagner, Wainwright, and Dyer, all of whom rose to distinction in after years. Worth was appointed colonel of the 8th Infantry, Ripley was pro-

* Worth's commission as captain of artillery was senior to Wade's, but I think he had never before served in the Ordnance. In 1838 he was appointed colonel of the newly organized 8th Infantry and his career in the Mexican War, where he served in his brevet rank of major general, is familiar history.

moted to be major, and Lomax was transferred and reappointed major from the artillery. In 1841 were added the names of Gorgas and Rodman, in 1842 those of Laidley and Benton.

The decade from 1840 to 1850 was a most creditable one. The proportion of very able men in the corps was such as could be equalled by very few organizations in any army. In 1841 the Ordnance Board was established,—a feature of the department which still exists, though its functions are in a large measure superseded by the Board of Ordnance and Fortification. It has been a very serviceable institution. It has always been composed of ordnance officers of great experience and ability. The mixed boards which preceded it had yielded comparatively small results, owing to want of harmony of views among the members. The new board being more homogeneous accomplished more every year than its predecessors had accomplished in three or four. The first work before it was systematizing the armament of the country, including, so far as practicable, the entire range of ordnance material, making complete the equipment of every arm of the service in all details, preparing working drawings of every part in such manner that they could be made of exact record and regulation. It was also advisory to the Chief of Ordnance on all matters referred to it concerning improvements in material and as to experiments upon new devices or inventions. Its systematic work lasted eight years, at the end of which time (1849) it may be said that we had, in theory at least, a true system of ordance material and the means of creating any amount of it that Congress might deem it fitting to appropriate the money for. The equipment of light batteries was completed in 1842, and their performance in the Mexican War is well known. Material for siege trains had received full consideration by 1845, and at the outbreak of that war an effective siege train was assembled by Huger assisted by Hagner, and took a highly creditable part in the operations of General Scott's army from Vera Cruz to the City of Mexico. The mounting of guns in casemate and barbette was completely revised, the cast-iron carriages which had been preferred since 1820 being virtually condemned in 1839, and timber carriages were again adopted.*

The armories at Springfield and Harper's Ferry since their first establishment in 1798 had been under the immediate charge of civil superintendents. Though placed under the nominal control of the Ordnance Department by the law of 1815, it seems to have been held that the executive management of the affairs of the armories was vested by law in the superintendents. Although some highly objectionable features of the management had grown up and were well known, no decisive measures were taken by the Secretary of War to correct them until 1842. By an act approved August 23, 1842, the offices of civil superintendents were abolished and the duties were imposed upon officers of the Ordnance Corps. Craig was put in command at Harper's Ferry, and Ripley at Springfield.

The same act provided for the employment by the Ordnance Bureau of a competent person to superintend the manufacture of iron cannon. This

* Lieut. Birkhimer's "History of the Artillery" gives a good summary of the changes in heavy gun carriages, page 254.

was no doubt intended for the recall of Wade to his proper sphere. Since his resignation in 1832 he had been in the employ of the Fort Pitt Foundry at Pittsburg, and as a result of many costly experiments had made great progress in obtaining large iron castings of increased strength and reliability. This was of much importance in view of the desire to obtain guns of greatly increased power. About 1830 Bomford had designed a class of large guns for firing shells to which he gave the grotesque name of "Columbiads." At first they were 50 and 100-pounders, but owing to the uncertain character of the metal it was deemed inexpedient to procure more than sufficed for a trial of them. In 1843 shell guns (columbiads) of 8 and 10-inch calibre were undertaken with some degree of success. The metal was of excellent quality, but it had become plain that its advantages could not be fully realized until advances were made in the knowledge of gunpowder and in controlling its action. Experiments upon gunpowder were begun by Mordecai at the Washington Arsenal in 1843. As models of scientific method in research they will always rank high. The results lie at the foundation of those remarkable improvements in the use and control of that agent which came in after years. Their completion rendered possible a considerable advance in the power of heavy artillery.

In 1842 Talcott became the real Chief of Ordnance, and after Bomford's death in 1848 was promoted to be colonel. During the Mexican War there were added to the corps by the act of March 3, 1847, two captains and six lieutenants. Among the new names, appear those of Charles P. Stone (1845) and Jesse L. Reno (1846), Julian McAllister (1847), and S. V. Benet (1849), all of whom attained distinction in after years.

Great as had been the advances from 1840 to 1850, those from 1850 to 1860 were greater still. But it will be impossible to do more here than to allude to the most important. First in importance was the adoption of the rifled musket in place of the smooth-bore. The invention of the sub-calibre expanding bullet was the turning point. Prior to that, the rifle was the inferior arm in the main line of battle, and its utility had been limited to special corps of troops. The new bullet made it superior for all purposes, and in 1855 the rifle was adopted in all the armies of the world as the infantry arm. It was in the early part of this decade that Rodman's experiments were mostly conducted on metals, resulting in the establishment of the principle of initial tensions in the construction of cannon. His experiments on gunpowder, establishing the control of its combustion and carrying that control further than had ever before been contemplated soon followed. Of all methods of applying the principle of initial tensions, Rodman's was the crudest and least satisfactory. But the demonstration of the principle itself, remains as the most important contribution to the art of gun construction which has ever been made, and established his fame as effectively as the twitching of the frog's legs established the fame of Volta. Little if any less important was the control of the action of gunpowder. But Rodman's contribution in this line, while entitling him to high honor, must be shared by others.

This decade 1850–1860 was remarkable for the extraordinary number of devices for breech-loading arms, as well as for attempts to introduce rifled

cannon. The results were at best very imperfect, though important advances and some partial successes were attained. The introduction of breech-loading arms as a finality took place immediately after the war, and was determined by a great invention which in the period was little thought of though it was foreshadowed. This will be spoken of further on. The cavalry, however, accepted the Sharp's carbine in 1857, after a stubborn resistance to all breech-loading arms, beginning with the organization of the 1st Dragoons in 1833. Of the many forms of breech-loading arms, Sharp's model was doubtless the best, but the ammunition was from its nature very perishable.

Perhaps no better indication of the character of the progress of that decade can be found than in two inventions, Rodman's pressure gauge, and Benton's electro-chronograph. The first (with the crusher improvement) is indispensable in interior ballistics; the second was an important addition to the many devices which are equally indispensable in exterior ballistics. They effected a revolution in scientific methods of investigating the more difficult problems of gunnery.

In this decade also began the transitions from ancient to modern artillery. It proceeded by slow and difficult steps. The establishment of the principle of initial tensions and the control of gunpowder were two great achievements. But before they could be so utilized as to secure the enormously improved results which were afterwards reached, collateral advances along other lines were necessary. The enlarged chamber leading to the principle of variable "density of loading" was a third advance. The development of the art of making large masses of steel suitable for guns was the fourth, and the longest delayed, as well as the most costly.

In 1851 Talcott was succeeded by Craig. Between 1850 and 1859 the corps received Crispin, Balch, Shunk, Treadwell, Baylor, O. O. Howard, Strong, Horace Porter, and Edson. Soon after the war Balch and Porter resigned; the others (except Major General Howard) are all dead. The seven senior officers of the corps now on the active list entered it in 1861.

The outbreak of the Civil War found the Ordnance Department in a trying situation. It had been its policy since its organization to accumulate as large a store of the durable munitions of war as its appropriations permitted. But the change from smooth-bore to rifle in 1855 had rendered the old muskets obsolete. Such rifles as had been procured since that year had been mostly distributed to the army and militia, and nearly all of the remainder had been sent by Secretary Floyd to the Southern States in anticipation of secession. The first Secretary under Mr. Lincoln took the matter of providing arms to volunteers in chief part into his own hands, and sent agents to Europe to purchase whatever arms could be found. Meantime, measures were taken to enlarge the capacity of Springfield Armory, and contracts were made with private armories to furnish with the greatest practicable haste large supplies of muskets of the Springfield pattern. This required time, and the first volunteer troops were in many cases armed with indifferent weapons derived largely from Europe, and of several widely distinct patterns. All other supplies were forthcoming in abundance about as fast as the troops were ready to receive them, and from the begin-

ning to the end of the war there was no lack of small arms, artillery ammunition, or equipments. Much of the contract work and material was of inferior quality in comparison with the outputs of the Arsenal, but this was due in a great measure to the fact that the Government had accumulations of good raw materials and specially-trained workmen, while contractors found it difficult and sometimes impossible to secure them. The efficiency of a well-trained corps of officers was signally displayed in the promptness, accuracy and good judgment with which all demands upon it were met, and in the judicious economy with which its material was managed and husbanded.

But at the outbreak of the war, the corps lost some of its best officers. Mordecai resigned, but did not give his great abilities to the South. Gorgas became Chief of Ordnance to the Confederacy, and displayed the highest ability in that office. Bell, Huger, John F. Lee, and Welcker, resigned and entered the Confederate service. Strong became a brigadier, and afterwards a major general of volunteers, and was killed in the attack on Fort Wagner. Reno (Jesse L.) also became a major general of volunteers and died most gallantly at South Mountain. The distinguished career of Oliver O. Howard, who was a first lieutenant of Ordnance at the beginning of the war, can only be alluded to here.

The need of more Ordnance officers was obvious, and the act of August 3, 1861, provided that "there shall be added to the Ordnance Department * * * one Chief of Ordnance, with the rank, pay and emoluments of the Quartermaster General of the army, one colonel, one lieutenant colonel, and six second lieutenants, the field officers to be appointed by selection from the officers of the army, and the second lieutenants from the graduates of the Military Academy, by transfers from the engineers, or the topographical engineers, or the artillery." The office of Chief of Ordnance, with the rank of brigadier general being thus an original vacancy, was filled by the promotion of Ripley over the head of Craig. The field officers were selected from the Ordnance Corps in accordance with seniority. As thus organized, the corps numbered (January 1, 1862), one brigadier general, two colonels, two lieutenant colonels, four majors, twelve captains, twelve first lieutenants, eight second lieutenants, twelve storekeepers, and four vacancies in the lowest grade.

The act of March 3, 1863, provided for the addition of one lieutenant colonel, two majors, eight captains, and eight first lieutenants, to be appointed by promotion, and the vacancies at the foot of the list to be filled by transfers from regiments or other corps of the army. It also provided "that no officer of the Ordnance Department below the rank of a field officer shall be promoted to a higher grade, nor shall any officer of the army be commissioned as an Ordnance officer, until he shall have passed a satisfactory examination before a board of not less than three Ordnance officers senior to him in rank." It also provided that this organization should continue only during the Rebellion, and that thereafter the officers promoted should have the rank they would have had if the act had not passed, and the number should be reduced to the organization of August 3, 1861. By the act of July 28, 1866, the number of officers authorized by the act of

March 3, 1863, was made permanent, but with the following grades: one brigadier general, three colonels, four lieutenant colonels, ten majors, twenty captains, sixteen first lieutenants, ten second lieutenants, and thirteen Ordnance storekeepers.

In June, 1863, Craig, and in September following, Ripley, were retired after more than forty-five years of active service, and George D. Ramsey was appointed Chief of Ordnance. He was the senior officer of the corps at the time of Ripley's retirement, having entered the artillery in 1820 and transferred to the Ordnance as a captain in 1835. In September, 1864, Ramsey was retired, and Major A. B. Dyer, then commanding the Springfield Armory, was appointed Chief.

The close of the war was followed by dark days for the Ordnance. Disappointed contractors and inventors whose hopes had not been realized, were embittered against the bureau and carried their grievances into Congress. A joint committee was appointed to investigate their complaints, and the procedure, it is gratifying to know, has not often been paralleled in Congressional committees. Its report (drafted by the most bitter and most unreasonable of the complainants) reflected severely upon General Dyer, who at once asked for a court-martial. It was refused, and he then asked for a court of inquiry, which was granted. The inquiry of the court was long and thorough, and not only exonerated him, but held him up as an example worthy of the imitation of all army officers. Probably the worst effect of the investigation by the Congressional committee was the encouragement it afforded to similar attacks, and though this appears to have been the only personal one, the Ordnance Department found to its great embarrassment that similar influences were ever present to poison the minds of Committees against all its projects for the improvement of heavy ordnance, and to impose upon it heavy burdens of proof against other projects which it could in no way recommend. These influences were maintained through many years. They created a feeling of distrust towards the Department and its officers for which there was no real ground. They caused Committees to give precedence to and vote large sums for, the trial of costly devices whose failure was assured in advance, and every attempt in the true path of improvement was hampered or kept waiting indefinitely.

The year 1866 marks a revolution in the armament of the infantry. To say that it marks the change from the muzzle-loading to the breech-loading musket does not accurately nor logically express its real significance. Breech-loading arms, both great and small, have been experimented with for at least three, and perhaps four, centuries. The period from 1840 to 1857 abounded in devices for breech loading which became more numerous every year. It is a common idea that the aversion to them on the part of all officers was founded in mere conservatism, or even prejudice. But the truth was otherwise. All things considered, the breech-loaders were inferior to muzzle-loaders, and the superiority of the former was established only when the centre fire metallic cartridge was perfected. The ordinary notion is that powder and ball are mere accessories to the gun; that the gun is the all-important and substantive thing, while the cartridge is a minor incident. So all-pervading has this idea been in times past, that even the most expert

have been not only influenced by it, but sometimes governed by it. The truth is the opposite. The cartridge is primary and antecedent, the gun secondary and consequent. Before the metallic cartridge was perfected, breech-loading arms were all of varying degrees of badness; afterwards they were all of varying degrees of goodness. At no time since, has there been a year in which it was not possible to select half a dozen or more designs of breech-loaders, such that if we were to assign 100 as a figure of merit for the best, the corresponding figure for the poorest would be at least 90 and perhaps 95. Under the old system, the ball, the powder and the priming were separate and separately handled; under the new system, they formed one piece. The gun with its breech mechanism follows as a logical sequence.

We may now perceive why progress with breech-loading arms was so slow, prior to the war, and why "science moved but slowly, slowly, creeping on from point to point." All inventive thought was concentrated on the gun as the primary factor. But when the centre fire metallic cartridge was developed—presto! "Science" had put on its seven-leagued boots. The change to the breech-loader took place at a bound.

These remarks are offered as a general answer to the frequent criticism that Ordnance officers were slow to adopt improved arms, and that they were behind other nations in this respect. If our army was later than others in receiving breech-loaders, it was the first to have the metallic cartridge, and other armies only got bad muskets and worse ammunition by being too previous.

The metallic cartridge it seems to me is the greatest military invention since the discovery of gunpowder. It is, however, an evolution rather than an invention, embodying a slow accretion of the ideas of many workers and inventors. The earliest patent I am aware of on the centre-fire form is that of Morse, though his design is crude. It was, however, worked up to a thoroughly effective form and with many changes at the Frankford Arsenal. With the developed form came the necessity of providing machinery for manufacturing it rapidly and cheaply. This, too, was accomplished at the same arsenal during the commands of Benet and Treadwell. The designer of this machinery was Jabez H. Gill, a master mechanic at Frankford, who was much aided by Robert Bolton, the foreman of the cartridge factory. Achievements such as theirs, if attained outside of the government service, would have made their names illustrious.

The development of the Springfield rifle, with the swinging breech-block, quickly followed. Though some minor improvements have been made from time to time, its essential features have lasted to the present. While foreign armies have changed their arms repeatedly, and while our own Ordnance Department has repeatedly offered competing arms which seemed from the tests of the proving ground to be better, the infantry have clung to the Springfield arm with a tenacity for which Ordnance officers sometimes find it difficult to account. In the change to the magazine system, the policy of the Department has been the same as in the sixties; it is comprised in the old proverb: "Be sure you are right and then go ahead." In this second change, something more than a device for the more rapid loading and discharge of cartridges was required, and that was a cartridge of reduced size and

weight, without any reduction, but rather with an increase of power. Until the cartridge was greatly improved the change was at best of very doubtful advantage.

The act of March 8, 1869 (Army Appropriations bill), stopped all promotions and appointments in the staff corps until further legislation. The act of June 23, 1874, reopened promotions and gave to the corps its present organization. The grade of second lieutenant of Ordnance was abolished, and also Ordnance storekeepers, but without affecting the status of the storekeepers then in service. All vacancies in the grade of first lieutenant were to be filled by transfer from the line, and all promotions and appointments to be subject to a satisfactory examination before a board of Ordnance officers. These provisions have been of great value and importance to the corps, and are in a large measure due to the efforts of the lamented Lyford. They have secured a class of officers to whom the professional reputation of the corps may be entrusted for many years to come with the entire confidence of the army and the country. There might seem to be one drawback, as it has thus far had the effect of taking from the artillery some of its brightest and most capable lieutenants; but that corps is so abundantly supplied with splendid material of that kind that it will hardly feel the drain.

In May, 1874, General Dyer, after a long illness, passed away, and in the following month, S. V. Benet, then a major in the corps, was appointed Chief of Ordnance, which position he held until his retirement in 1891.

Since the close of the war, the corps has suffered the severest visitations of death. The complete list of those who have died in active service since the war is, Wainwright, Rodman, Benton, Crispin, Shunk, Todd, Treadwell, Baylor, Edson, Bradford, Hill, Buel, Lyford, Edie, Chaffee, C. F. Rockwell, McKee, Ramsay, Jr., Michaelis, Prince, Poland, Clifford, Wright, Starring, Wier, Medcalfe. If death loves a shining mark, he seldom missed it when he aimed at the Ordnance Corps. If the average efficiency of their successors shall be as great as theirs, more could not reasonably be asked nor expected. The names of those who have passed in the same time to the retired list and thence to their graves will also serve to recall the early history of the corps in whose achievements they bore a highly honorable part. The assemblage of names is a strong one: Craig, Ripley, Ramsay, Maynadier, Thornton, Hagner, Laidley, McAllister. Of the corps which antedates the Mexican War, there is but one survivor, Colonel and Brevet Brigadier General R. H. K. Whiteley, whom the older officers of the present corps recall, not only with profound respect and admiration, but with affection. He and his contemporaries just mentioned, present themselves to our recollection as models to be imitated in respect to industry, fidelity, discipline, devotion to duty in the military relation, and dignified courtesy in the private one.

The recency of General Benet's command would make it from a military point of view indecorous for me to do more than to respectfully offer my congratulations upon the high efficiency of the corps and of the department at the term of his administration.

THE FIFTH REGIMENT OF INFANTRY.

Compiled in the Office of the Military Service Institution.

THE first Fifth Infantry formed in our service after the adoption of the Constitution was organized under the Act of July 16, 1798. At that time a war with France seemed inevitable, but the danger passed away and this regiment was discharged under the Act of May 14, 1800.

The unfortunate affair of the *Chesapeake* and *Leopard*, followed by the decrees of the Emperor Napoleon in regard to neutral commerce, and the retaliatory measures adopted by the British government, caused a degree of excitement in the United States in 1807–1808, which bid fair to lead to war and did lead to an increase in the strength of the army. As a part of this increase the second Fifth Infantry came into being under the Act of April 12, 1808. Its first colonel was Alexander Parker, who had been a captain in the 2d Virginia Regiment of the Continental army; but he resigned after a service of a year and a half, and in the next five years had five successors. Evidently the commission of colonel in the regular army was valued at a much lower rate then than at the present time.

This regiment took part in the action at Cook's Mill on Lyon's Creek, Upper Canada (Ontario), October 19, 1814. The successful sortie from Fort Erie which had caused the British to raise the siege and retreat to their old entrenchments on the Chippeway River, had taken place a month before, and the American army on the Niagara now numbered some 8000 men. Hearing of a considerable quantity of grain belonging to the British at Cook's Mill, a brigade was sent out October 18 to destroy it, which camped that night in the vicinity of the mill. The British attacked during the night but were repulsed. They renewed the attack in the morning, but the main body came up, "Colonel Pinkney with his Fifth Regiment was ordered to turn the right flank of the enemy and cut off his field-piece," other dispositions were also promptly made, and after a sharp action the British fell back in confusion, retreating to Fort George and Burlington Heights.

In May, 1815, this Fifth Infantry was consolidated with the 18th and 35th regiments to form the Eighth Infantry, which regiment was discharged the service, June 1, 1821.

A new Fifth Infantry was organized May 15, 1815, under the Act of March 3, 1815, by the consolidation of the 4th, 9th, 13th, 21st, 40th, and 46th regiments of infantry, and this regiment is now in service.

Its first colonel was James Miller, the one who at Lundy's Lane, when asked if he could take a certain work from the enemy, replied modestly, "I'll try, sir," and proceeded to take it in the most gallant style. None stood higher than he. He was brevetted a brigadier general and was given a gold medal by Congress.

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The other officers of the regiment, as given by the roster for May 17, 1815, were Lieutenant Colonel J. L. Smith, Major J. McNeal, Jr. (colonel by brevet for Lundy's Lane), Captains J. H. Vose (brevet major for Mackinac), S. Burbank (brevet major for Lundy's Lane), Geo. Bender, M. Marston (brevet major for Fort Erie), W. L. Foster, Peter Pelham, J. Fowle, E. Childs, David Perry, and James Pratt.

First Lieutenants H. Whiting, E. Ripley, J. Plympton, D. Chandler, J. Cilley, J. Ingersoll, Otis Fisher, J. Gleason, J. W. Holding and B. F. Larned.

Second Lieutenants N. Clark, S. Keeler, S. Robinson, J. Craig, G. H. Balding, I. K. Jacobs, G. W. Jacobs, A. D. Dake, P. R. Green, and C. Blake.

Surgeon Sylvester Day, and Surgeon's Mates E. L. Allen and J. P. Russell.

Regimental Headquarters were established at Detroit, Michigan, in December, 1815, and probably remained there until 1821, but in May of 1821 seven companies of the regiment were at St. Peters, two at Prairie du Chien, and one at Fort Armstrong.

In 1825 the headquarters were at Fort Snelling, and from that time until 1845 the regiment occupied some three or four of the following named posts, all of which were within the limits of the present States of Michigan, Wisconsin, Illinois and Nebraska;—Forts Armstrong, Atkinson, Brady, Crawford, Dearborn, Gratiot, Howard, Mackinac, Wilkins and Winnebago, and Detroit Barracks.

There was undoubtedly occasional field service during this long period, usually to overawe the Indians, but on one occasion the regiment and the Indians came into actual conflict. This was during the Black Hawk War of 1841–42. The Indians had been defeated on the 21st of July, 1842, by the volunteers, and were in full flight for the Mississippi. General Atkinson, with a force of regulars and volunteers numbering some 1400 men, came up with them August 2, 1842, near the junction of Bad Axe Creek with the Mississippi, attacked and completely routed them, thus ending the war. A part, if not all, of the regiment was engaged in this battle.

General Miller resigned in 1819 to become governor of the Arkansas Territory and was succeeded by Josiah Snelling, a distinguished officer for whom Fort Snelling was named, who died in August, 1828. Lieutenant Colonel William Lawrence, of the Second Infantry, who had been brevetted in 1814 for his gallant defense of Fort Bowyer, Ala., became colonel of the Fifth in place of Snelling, but resigned in 1831 and was succeeded by Brevet Brigadier General G. M. Brooke, promoted from the Fourth, who commanded the regiment until his death twenty years later.

Early in the year 1845 the Mexican minister at Washington had protested against the annexation of Texas to the United States, but Congress finally assented to it, and while Texas was framing her constitution as a future State, the President ordered the concentration of a body of U. S. troops between the River Nueces and the Rio Grande for her protection should she be attacked by Mexico. The Fifth Infantry was among the regiments designated for this duty, and on the 11th of October, 1845, five companies of the regiment, under Lieutenant Colonel McIntosh, reached Corpus Christi, Texas, and reported to General Z. Taylor, who had been

designated to command this "Army of Occupation." On the 9th of March, 1846, the march to the Rio Grande began, and on the 28th the army reached that river opposite Matamoras and there went into camp. General Taylor had with him about 2300 men, including the 2d Dragoons, three light batteries, a battalion of foot artillery, and the 3d, 4th, 5th, 7th, and 8th regiments of infantry.

General Taylor's depot was at Point Isabel—27 miles distant—and the Mexicans were soon reported to be in force on his line of supply. Fortifying the position opposite Matamoras and leaving a small garrison there, he marched the main body of the army to Point Isabel, but met with no opposition by the way. Having fortified that post he started upon the return and encountered the Mexican army in force at Palo Alto on the 8th of May.

The action began at 2 o'clock P. M., and for some time was conducted almost wholly by the artillery. About 3 o'clock "a large body of the enemy's red lancers charged the 5th Infantry with a view to cutting off our wagon train. They were met with the most perfect tranquility, and a discharge of musketry from the 5th told us their fate. They fled precipitately, leaving men, horses and guidons on the field." The action lasted until about 7 P. M,, when the enemy retreated.

General Taylor resumed the advance early on the 8th and encountered the Mexicans during the afternoon in position at a sort of ravine, called Resaca de la Palma, which ran obliquely to his line of advance. The Mexican artillery swept the road by which the American army must advance, and their best troops were in support. The battle began at once. May made his famous charge, in which he captured the Mexican guns, but was unable to carry them off; then the infantry,—chiefly the 5th and 8th, —charged the Mexican centre, breaking it and driving the Mexicans in utter rout before them. The American loss in these two battles was three officers and 35 men killed, and 13 officers and about 100 men wounded.

The American army soon afterward occupied Matamoras, and in August and September moved up the Rio Grande to Camargo and thence to Monterey, before which city it arrived September 19, 1846, scarcely 7000 strong.

The Fifth Infantry was in Worth's Division and took part in the turning movement by which the enemy's line of communication was cut, and he was shut up in the city and forced to surrender. It was in the second line and was not actively engaged until the first line attacked Federation Hill and was seen to be threatened by heavy Mexican reinforcements.

"This induced General Worth to order Colonel P. F. Smith forward, with the Fifth Infantry under Major Martin Scott, to take part in the contest. Captain C. F. Smith (commanding a part of the first line) drove the enemy from the battery and breastworks nearest to us, but he then discovered another work called Fort Soldado, several hundred yards further on, and there was great emulation among the regiments to see which should reach it first. The Fifth Infantry won the race and went in over the parapet at one end as the Mexicans went out of the other."

Soon after daylight on the 23d, the suburbs of the city were occupied by the troops of the division and an advance from house to house continued all day. The enemy was now cooped in between Twiggs' Division on one side, and Worth's on the other, and on the 24th of September capitulated,

surrendering the city but marching out with their arms and with colors flying.

This is the last action in which the regiment took part in Northern Mexico, for in January, 1847, it was ordered to the mouth of the Rio Grande preparatory to a transfer to General Scott's line. At this time it numbered 23 officers and 397 men.

The Fifth Infantry did not take an active part in the siege of Vera Cruz, and Worth's Division, of which it formed a part, did not reach the field of Cerro Gordo until the enemy had displayed the white flag. The Division then took the advance and occupied the City and Castle of Perote on the 22d of April, capturing all the enemy's material there.

Eight companies of the regiment were in the thick of the fight at Churubusco, C and D at that time being away on escort duty. Company H also, although present, was detached from the regiment and formed part of Colonel C. F. Smith's light infantry battalion. The regiment went into action with 14 officers and 370 men, losing two officers wounded and 49 men killed, wounded and missing. It was in the 2d Brigade, Worth's Division, and took part in the turning movement which forced the evacuation of the enemy's works at San Antonio, and then followed the fleeing enemy rapidly along the causeway to Churubusco. Lieutenant Colonel McIntosh, commanding the Fifth, became the brigade commander in the midst of the action by the wounding of Colonel Clarke, and Brevet Lieutenant Colonel M. Scott succeeded him in command of the regiment. Arriving before the *tête de pont* at Churubusco the regiment moved around the enemy's works to the right, and "was among the first to storm them and drive the enemy's troops towards the city."

On this date, August 20, 1847, the absent companies,—C and D,—had just finished a march of 14 days as part of the escort to a train from Vera Cruz to Jalapa, having had four engagements by the way,—at Paso Ovejas, The National Bridge, Cerro Gordo, and Las Animas,—with the Mexican guerillas, who believed that the train contained a large amount of specie.

The battle of Molino del Rey gave an opportunity for the regiment to show its metal which was taken advantage of to the fullest extent. It was represented on the assaulting party by Captain Merrill and 100 men; Company H was still with the light battalion, and Companies C and D were still absent.

Worth's Division was under arms at 3 o'clock on the morning of the 8th September, 1847, and by four o'clock was in position and ready for the assault upon the enemy's works. As soon as it was light enough to distinguish his position the assaulting column moved forward.

"At the distance of 200 yards the enemy opened on us with round and grape shot with considerable effect, the ground being perfectly level. I instantly ordered the double quick step; the line advanced rapidly and immediately came within close musket range. I found the enemy securely and strongly posted within his fort, and lines on either flank extending beyond view. He had extended his artillery, which was placed a little in advance, and with his immense superiority in numbers, and comparatively secure, was enabled to concentrate all his fire upon our ranks, already very much reduced in numbers. Myself struck down with a musket ball, I was unable to see the

state of the contest for a few moments, and was soon after obliged to leave the field, not, however, before witnessing the movement of the gallant light battalion to support the advance. The assaulting column continued the combat, in conjunction with the other corps of the Division, until the enemy's positions were all carried and we remained in possession of the field; after which there being but three officers left and the rank and file very much reduced, they joined their respective regiments."*

The position assigned the regiment was on the left of the Division line, near Duncan's Battery, where it also charged the enemy's fortified line, the great losses sustained testifying to the gallantry of the attack.

"Brevet Colonel McIntosh, temporarily in command of the brigade, was thrice wounded while gallantly engaged in urging on the command. He is happily still preserved to us. Brevet Lieutenant Colonel Scott, commanding the regiment, was very active, as he always was, in leading and urging on the regiment to the charge. When within about 20 yards of the enemy, he received a mortal wound and almost immediately expired. He left no better or more gallant soldier to lament his fall, and met his fate with his face to the enemy at the head of his command. The conscientious, gallant and noble Merrill was detached with the storming party and fell early in the action while waving his sword above his head and urging on his men to the charge."†

The regiment (exclusive of Companies C, D and H) numbered 13 officers and 342 men on the date of this battle, and its loss was 3 officers and 27 men killed; 4 officers and 107 men wounded; and 5 men missing,—a loss of 40 per cent. of its entire strength.

A storming party of 10 officers and 260 men, volunteers, was furnished by Worth's Division for the storming of the Castle of Chapultepec, September 13, and the remainder of the Division was ordered to support Pillow's Division; but the support was called upon early in the day, and the 2d Brigade, mingling with the advancing forces, entered with them into the Castle of Chapultepec. Meantime the 1st Brigade moved along the San Cosme road, followed very soon by the victorious 2d Brigade from the Castle. Arriving at 250 yards from the Garita San Cosme, the 2d Brigade was ordered to take the buildings on the left of the road "and, by the use of bars and picks, burrow through from house to house, to carry the right of the Garita." At 5 o'clock a position was reached from which it was necessary to make a dash for the gate. General Worth says:

"The moment had now arrived for the final and combined attack upon the last stronghold of the enemy in my quarter; it was made by our men springing as if by magic, to the tops of the houses into which they had patiently and quietly made their way with bar and pick, and to the utter surprise and consternation of the enemy, opening upon him, within easy range, a destructive fire of musketry. A single discharge, in which many of his gunners were killed at their pieces, was sufficient to drive him in confusion from his breastworks; when a prolonged shout from our brave fellows announced that we were in possession of the Garita of San Cosme, and already in the City of Mexico."

The City of Mexico surrendered September 14, 1847, and the war was virtually over.

Thirty officers of the regiment had served with it at different times

* Report of Brevet Major George Wright, 8th Infantry, commanding assaulting column.

† Report of Captain Wm. Chapman, 5th Infantry, Commanding Regiment.

during the war, and of these 7 were killed or mortally wounded, 8 were more or less severely wounded, 1 was murdered while carrying dispatches and 1 died of disease.

Seven were twice brevetted and 11 received one brevet each, while 24 of the 30 are mentioned one or more times as "distinguished in action." Only eight officers of the regiment,—Major Martin Scott, Captains M. E. Merrill, and William Chapman, and Lieutenants S. H. Fowler, M. Rosecrans, E. B. Strong, J. P. Smith and P. A. Farrelly,—served in the field from the beginning to the end of the war, and of these Major Scott, Captain Merrill, and Lieutenant Strong were killed at Molino del Rey, and Lieutenant Smith at Chapultepec.

Peace was declared in May, 1848, and on the 12th of June the last of the American troops left the City of Mexico. The Fifth was sent to the Arkansas and Indian Territories, and on January 1, 1849, its companies were occupying Forts Gibson, Smith, Washita and Towson.

The veteran colonel of the regiment.—George M. Brooke,—was at this time commanding the 8th Military Department, with the brevet rank of major general which had been conferred upon him for services during the war. He died at his headquarters,—San Antonio, Texas,—March 9, 1851. Lieutenant Colonel Gustavus Loomis, 6th Infantry, was promoted to the Fifth in his stead, and continued to be its colonel until he was retired in 1863.

In 1851 the Fifth relieved the Seventh in Texas, and at first occupied posts on the Clear Fork and Red Fork of the Brazos River, finally concentrating at Fort Belknap, on the Red Fork, eight miles above its junction with the Clear Fork,—which post was established June 13, 1851, and named for Lieutenant Colonel W. G. Belknap, then commanding the regiment.

In January, 1854, the regiment was at Fort McIntosh, and later, a part of it occupied Fort Ringgold; but in 1857 it was sent to Florida, with headquarters at Fort Myers. General Scott's G. O. No. 4, series of 1857, mentions the following fight in which a small part of the regiment was engaged.

"Lieutenant Edmund Freeman, 5th Infantry, reconnoitring with a small party in the Big Cypress Swamp, near Bowleg's town, Florida, was attacked by the Seminoles, March 5, himself and three of his men severely wounded and one man killed. Captain Carter L. Stevenson, 5th Infantry, called by express from Fort Keats 20 miles distant, came rapidly to the relief of Lieutenant Freeman's party, attacked the enemy, and, after a gallant skirmish, put them to flight, with an evident loss to the Indians, the extent of which could not be ascertained, owing to the density of the hummock."

The tour of service of the regiment in Florida was very short, for in June, 1857, an expedition to Utah was organized, of which it formed a part, and in September of that year it was at Fort Laramie. On the 4th of October, under Lieutenant Colonel C. A. Waite, it reached Camp Winfield, U. T., about thirty miles northwest from Fort Bridger. Here it remained until July, 1858, when it entered the Valley of Salt Lake with the "Army of Utah," taking position at Camp Floyd, afterwards called Fort Crittenden. Here or in this vicinity it remained without incident of note until

the fall of 1860, when it was transferred to New Mexico and stationed at Forts Defiance, Fontleroy, Stanton, and Hatch's Ranch.

The outbreak of the Rebellion found the regiment still in New Mexico, but in May and June, 1861, it was concentrating at Albuquerque and Fort Union with a view to a transfer East. The remonstrances of the department commander, however, caused a revocation of the order, and in February, 1862, the regiment was still in New Mexico, and five of its companies formed a part of the garrison of Fort Craig. Four of these companies, B, D, F and I, took part in the battle of Valverde, on the 21st of that month.

At first this action promised to be a victory and the enemy was driven some distance, but he rallied and attacked the flank of the Union army, forcing it to retreat. The four companies of the Fifth performed the most valuable service of the day in covering the final retreat. General Canby says:

"The movement of Selden's column (four companies of the Fifth Infantry), in the immediate presence and under the fire of the enemy, was admirably executed, the command moving with deliberation, halting occasionally to allow the wounded to keep up with it, and many of the men picking up and carrying with them the arms of their dead or wounded comrades."

Companies A and G, under Captain Lewis, took part in the action of March 28, 1862, at Apache Cañon, N. M. They formed part of Major Chivington's column, which was sent to attack the enemy's rear. The attack was successful and the enemy's train was captured and burned. To Captain Lewis' battalion was assigned the duty of capturing a field-piece, which it did effectually. "Captain Lewis capturing and spiking the gun after having five shots discharged at him. * * * Captain Lewis had the most dangerous duty assigned him, which he performed with unfaltering heroism."

The regiment took part in the action at Peralta, N. M., April 15, 1862. General Canby had concentrated his forces and on that date drove the Confederates out of their positions in front and in rear of the town. During the afternoon preparations were made for continuing the action, but that night the enemy evacuated the town and retreated towards Texas. A vigorous pursuit was made, and during the night of the 16th the enemy abandoned a large portion of his train and fled into the mountains.

On the 10th of August, 1862, four companies of the regiment met General Carleton's column from California at Las Cruses, and at the end of September Companies D, E, F and G were at Peralta under Captain Bristol, and Companies A, B, I and K, at Fort Craig under Captain Archer.

The regiment remained in New Mexico without further incident of note until the redistribution of the regular regiments in 1866. It was then assigned to the Department of the Missouri, comprising the States of Missouri, Kansas, and the territories of Colorado and New Mexico. Although the companies of the regiment were not called upon to take part in any of the great campaigns of the war, many of the officers who belonged or had belonged to it were found fighting on one side or the other. Generals David Hunter, H. P. Van Cleve, J. C. Robinson, C. S. Hamilton,

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J. J. Abercrombie, T. H. Neill, W. W. Burns, A. T. A. Torbert, and R. S. Granger, all held actual rank as general officers in the volunteer forces; and Generals Daniel Ruggles, C. L. Stevenson, W. N. R. Beall, A. Gracie, Jr., and B. M. Thomas were found upon the opposite side. On the 20th of October, 1868, regimental headquarters and two companies were at Fort Riley, and the other companies were at Forts Wallace, Hays, Lyon, Reynolds, and Camps Davidson and Cottonwood Creek, all in Kansas.

On the 1st of June, 1863, Colonel Loomis retired from active service. He had not served with the regiment since July, 1857, after which time he was commanding the Department of Florida, or was absent with leave, until after the Fifth had left Utah. From August, 1861, until the date of his retirement, he had been the Superintendent of the General Recruiting Service for the regular army.

John F. Reynolds, major general of volunteers and lieutenant colonel 14th Infantry, succeeded Colonel Loomis, and just one month later was killed at Gettysburg, promoting Daniel Butterfield, lieutenant colonel of the 12th and at that time major general of volunteers, who remained the colonel of the Fifth until he resigned, March 14, 1870, when Brevet Major General Nelson A. Miles, colonel of the 40th Infantry, was transferred to the Fifth to fill the vacancy.

The service of the regiment in Kansas was far from being uneventful, yet few opportunities were offered for brilliant achievements.

In September, 1868, Colonel G. A. Forsyth with 50 scouts followed the trail of an Indian party to the Arickaree Fork of the Republican River where he was attacked by about 700 Indians. After a very gallant fight he repulsed them, but they surrounded him and held him on the battle field for eight days, until the arrival of a hundred men from Fort Wallace, sent by Brevet Lieut. Col. Bankhead, 5th Infantry "with the most commendable energy" to his relief.

General Sheridan in his report for 1868 says:—"In addition there were a number of movements from posts, especially from Forts Wallace, Dodge, Lyon, and Hays, in which some Indians were killed."

Under the Act of March 3, 1869, the Fifth Infantry still retaining its own designation, was consolidated with one-half of the 37th Infantry, seven captains and fifteen lieutenants of the old regiment remaining with the new. The field officers were all changed, Brevet Major General Nelson A. Miles becoming the colonel; Brevet Major General C. R. Woods the lieutenant colonel; and Brevet Lieutenant Colonel George Gibson the major.

The 37th Regiment of Infantry was originally authorized as the 3d Battalion of the 19th Infantry under the Act of July 29, 1861; but it was not fully organized as a battalion until 1866, its companies having been formed in 1865–66. It therefore saw no service in the Rebellion. In the reorganization of 1869 the 3d Battalion of the 19th Infantry became the 37th Regiment of Infantry.

Early in May, 1870, the Indians raided the line of the Kansas Pacific R. R., and General Pope reports:

"As soon as the news of the raid reached me by telegraph I directed Lieutenant

Colonel C. R. Woods, 5th Infantry, commanding Fort Wallace, to take charge of the region of country along the railroad from Wallace to Denver and to transfer his headquarters to some convenient point between those places. I gave him general command for this service of the troops at Wallace, Lyon and Reynolds. * * * Colonel Woods promptly distributed his infantry force along the line of the roads and sent out four troops of cavalry under Major Reno, 7th Cavalry, in pursuit of the raiding party. The Indians, however, had too much the start and escaped across the Platte. * * * Another attack was attempted soon after, near River Bend, but the troops were at their stations and easily repulsed it."

For several years the Indians were unusually quiet in the region occupied by the Fifth, but in 1874 a band of hostile Comanches and Kiowas attacked the Wichita Agency, and General Miles was sent against them from Camp Supply, I. T., with 8 troops of the 6th Cavalry; four companies of his own regiment, and a section of artillery. At the same time four companies of the regiment and a troop of the 6th Cavalry were sent to the Cheyenne and Arapahoe Agency, to capture all hostile Indians who had been raiding and might seek safety from General Miles movements against them. General Sheridan says:

"August 30th, the column of Colonel Miles encountered the Indians near the headwaters of the Washita and kept up a running fight for several days, the Indians steadily falling back until they reached the hills about 8 miles from Salt Fork of Red River, where they made a stand but were promptly attacked, routed and pursued in a southwesterly direction, across the main Red River and out into the Staked Plains, with a loss of 3 killed, besides animals and camp equipage captured."

The troops had one soldier and one civilian wounded.

September 9th, Indians attacked Colonel Miles' supply train, escorted by about 60 men, commanded by Captain Lyman, 5th Infantry, on the Washita River, Texas, keeping it corralled there for several days until relief arrived from Camp Supply, I. T. One enlisted man was killed, one soldier, a wagon-master, and Lieutenant G. Lewis, 5th Infantry, were wounded.

"November 8th, near McClellan's Creek, Texas, Lieutenant F. D. Baldwin, 5th Infantry, with a detachment consisting of Troop D, 6th Cavalry, and Company D, 5th Infantry, attacked a large camp of Indians, routing them with the loss of much of their property. Two little white girls, Adelaide and Julia Germaine, aged five and seven years, were rescued from these Indians. The children stated that two older sisters were still held in captivity by the Indians. The story of their woe and suffering in captivity was pitiable in the extreme, not even their tender years sparing them from the most dreadful treatment. Their father, mother, brother and one sister were all murdered at the time the four sisters were captured. At the close of this campaign the other two sisters were rescued from the Indians and all four provided a comfortable home with the army at Fort Leavenworth, Kansas. General Miles became their guardian and Congress authorized the stoppage of an amount for the support of the children from the annuities of their captors, the southern Cheyennes."

General Miles' force, consisting of 8 troops of the 6th Cavalry, 4 of the 8th Cavalry, and four companies of the 5th Infantry, was actively and incessantly occupied from July 21, 1874, to February 12, 1875,

"in scouting the entire section infested by the Indian Territory bands, keeping the Indians so constantly on the move that they were unable to lay in any stock of provisions. This active work was continued by the troops upon the exposed and barren

plains of that region during the whole of a winter of unprecedented severity, and as the season advanced the difficulty of supplying the necessary forage and subsistence increased so that no little hardship and privation resulted; but the troops bore everything with fortitude and courage, and without complaint. By extraordinary efforts enough supplies reached the troops to keep them in the field until their work was done, and at length, early in March, 1875, the southern Cheyennes, completely broken down, gave up the contest, and under their principal chief, Stone Calf, the whole body of that tribe, with a trifling exception, surrendered themselves as prisoners of war."

The ringleaders among the Indians were selected to be sent to San Augustine, and on the 6th of April, while shackling "Black Horse," one of them, he broke away and ran towards the camp of his people. He was pursued and finally killed, and some of the shots fired at him passed over into the Indian camp, wounding several persons there. Upon this about one-half the Cheyenne tribe fled to the hills opposite the agency. Captain Bennett's company of the Fifth, with three troops of cavalry, all under Colonel O'Neill, followed,

"but the Indians, well supplied with the firearms they had hidden in that vicinity, occupied a difficult hill and maintained themselves against the troops for several hours until nightfall. By night the troops had forced their way nearly to the crest of the hill occupied by the Indians, but at daylight it was found the enemy had fled during the night. Eleven Indians were found dead and 19 soldiers were wounded. Troops from other posts in the vicinity were ordered to assist in the pursuit, and eventually most of the escaped Cheyennes gave themselves up."

For over a year no event worthy of notice occurred, but in June, 1876, the news of the Custer Massacre aroused the whole country. Reinforcements were gathered at once from all directions to send to Generals Terry and Crook, and the Fifth left the Department of the Missouri in which it had served so many years, for the Department of the Dakota, where, after several long and harassing marches in pursuit of the hostiles, who however, succeeded in eluding pursuit, it was sent to establish a post at the mouth of Tongue River, Montana, which was afterwards named Fort Keogh.

A train with supplies for this post left Glendive Creek, Montana, October 10, 1876, and its escort had a running fight with Sitting Bull's Indians until the 18th, when it was met by General Miles, who, alarmed for its safety, had come out with his whole regiment to meet it. Learning the immediate situation from Colonel Otis, commanding the escort, General Miles followed Sitting Bull, overtaking him near Cedar Creek, Montana, north of the Yellowstone. After several "talks" in which Sitting Bull manifested a strong desire for an "old-fashioned peace" but gave no indication of accepting the terms offered by General Miles, he was at last informed that he must accept or fight. General Sheridan says:

"The Indians took positions instantly for a fight and an engagement followed, the Indians being driven from every part of the field, through their camp ground, down Bad Route Creek and pursued 42 miles to the south side of the Yellowstone. In their retreat they abandoned tons of dried meat, quantities of lodge poles, camp equipage, ponies and broken down cavalry horses. Five dead warriors were left on the field, besides those they were seen to carry away. Their force was estimated at upwards of a thousand warriors. On October 27th, over 400 lodges of Indians, numbering about

2000 men, women and children, surrendered to Colonel Miles, five chiefs giving themselves up as hostages for the delivery of men, women, children, ponies, arms and ammunition at the agencies. Sitting Bull himself escaped northward with his own small band, and was later joined by 'Gall' and other chiefs with their followers. Having returned to Tongue River Cantonment, Colonel Miles organized a force of 434 rifles and moved north in pursuit of Sitting Bull, but the trail was obliterated by the snow in the vicinity of the Big Dry River. * * *

"On December 7, 1876, Lieutenant F. D. Baldwin, with Companies G, H and I, 5th Infantry, numbering 100 officers and men, overtook Sitting Bull's camp of 190 lodges, followed and drove it south of the Missouri near the mouth of Bark Creek. The Indians resisted Baldwin's crossing of the river for a short time, and then retreated into the bad lands.

"On December 18th, this same force under Lieutenant Baldwin surprised Sitting Bull's band of 122 lodges near the head of the Red Water, a southern affluent of the Missouri, capturing the entire camp and its contents, together with about 60 horses, ponies and mules. The Indians escaped with little besides what they had upon their persons, and scattered southward across the Yellowstone. * * *

"On the 29th of December, Colonel Miles, with Companies A, C, D, E and K, 5th Infantry, and Companies E and F, 22d Infantry, numbering 436 officers and men, with two pieces of artillery, moved out against the Sioux and Cheyennes under Crazy Horse, whose camp had been reported south of the Yellowstone, in the valley of the Tongue River. As the column moved up the Tongue, the Indians abandoned their winter camps, consisting of about 600 lodges, and the column had two sharp skirmishes on the 1st and 3d of January, 1877, driving the Indians up the valley of Tongue River until the night of the 7th, when the advance captured a young warrior and 7 Cheyenne women and children, who proved to be relatives of one of the head-men of the tribe. A determined attempt was made by the Indians to rescue the prisoners, and preparations were made for the severe fight to be expected the next day. On the morning of January 8th, about 600 warriors appeared in front of the troops and an engagement followed, lasting about five hours. The fight took place in a cañon, the Indians occupying a spur of the Wolf Mountain range, from which they were driven by repeated charges. The ground was covered with ice and snow to a depth of from one to three feet, and the latter portion of the engagement was fought in a blinding snow-storm, the troops stumbling and falling in scaling the ice and snow-covered cliffs from which the Indians were driven, with serious loss in killed and wounded, through the Wolf Mountains and in the direction of the Big Horn Range. The troops lost three men killed and eight wounded. The column then returned to the cantonment at the mouth of Tongue River. * * *

"The prisoners which Colonel Miles' command captured from Crazy Horse's village on the night of January 7th, proved a valuable acquisition in communicating with the hostiles and in arranging negotiations for their surrender."

A scout was sent out with two of the captives on February 1, to find the Indians and offer terms, and on the 19th returned with a party of chiefs and leading men. After several conferences 300 Indians surrendered unconditionally to General Miles on April 22, and some 2000 more in May at the Red Cloud and Spotted Tail Agencies.

From those who had surrendered, Colonel Miles learned that a band of renegades, chiefly Minneconjous under Lame Deer, had broken off and gone to the westward. On the 1st of May he started in pursuit with four troops of the 2d Cavalry, four companies of the 22d Infantry, and Companies E and

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H of the 5th Infantry. After a very hard march, with scarcely a halt for two nights and a day, Lame Deer's band was surprised May 7, the village charged in fine style, and the Indian herd cut off and secured. The leading Indians now appeared desirous of surrendering and the firing ceased, but, either meditating treachery or fearing it, they began firing again."

"This ended peace making and the fight was resumed, the hostiles being driven, in a running fight, 8 miles across the country to the Rosebud. Fourteen Indians were killed, including Lame Deer and Iron Star; 450 horses, mules and ponies, and the entire Indian camp outfit were captured, including 51 lodges well stored with supplies. Lieutenant A. M. Fuller, 2d Cavalry, was slightly wounded; four enlisted men were killed and six were wounded. The Indians who escaped subsequently moved eastward to the Little Missouri, and the command returned to the cantonment, where four companies,—B, F, G and I, 5th Infantry,—were mounted with the Indian ponies and continued to serve as cavalry until after the Nez Perces campaign in the following autumn."

Companies A, H and I of the Fifth, mounted, made a long difficult march in July and August, 1877, without actual fighting, but with excellent effect in forcing the Indians into a surrender.

In the latter part of July, 1877, the Nez Perces Indians, pursued by General Howard with troops from the Department of the Columbia, were making their way via the Lo-Lo trail toward Montana. General Miles received information, September 17, of their movements and marched rapidly in a northwest direction to intercept them. His force consisted of 6 troops of cavalry; Companies B, F, G, I and K, 5th Infantry; two pieces of light artillery, and detachments of white and Indian scouts. On the 25th he learned that the Indians had crossed the Missouri, and by very rapid forced marches the column reached the Deer Paw Range, September 29, where it struck the Indian village on the 30th. The battalions of the 7th Cavalry and 5th Infantry, mounted, charged directly upon the village.

"The attack was met by a desperate resistance and every advance was stubbornly contested by the Indians, but with a courageous persistence, fighting dismounted, the troops secured command of the whole Indian position, excepting the beds of the ravines in which some of the warriors were posted. A charge was made on foot, by a part of the 5th Infantry, down a slope and along the open valley of the creek into the village, but the fire of the Indians soon disabled thirty-five per cent. of the detachment which made the assault, and attempts to capture the village by such means had to be abandoned. * * * The Indian herd having been captured, the eventual escape of the village became almost impossible. The casualties to the troops had amounted to twenty per cent. of the force engaged, there were many wounded to care for, and there were neither tents nor fuel, a cold wind and snow storm prevailing on the night of September 30th."

In the first charge and the hot fighting which followed 2 officers and 22 men were killed, and 4 officers and 38 men wounded. Among the wounded were Lieutenants Baird and Romayne, of the Fifth. The Indians lost 17 killed and 40 wounded, and on October 4th the remainder of the band, numbering 87 warriors, 184 squaws, and 147 children, surrendered to General Miles.

In February, 1878, a column of mounted men 800 strong left Fort Keogh to find a large force of Sitting Bull's Indians, reported on the border; but

as they did not come south of the Missouri, and the War Department would not permit them to be attacked while they remained north of that river, the expedition was fruitless.

In August, 1878, the hostile Bannocks from the Department of the Columbia attempted to follow the Nez Perces trail of 1877, and General Miles, with 100 men of the 5th Infantry and 35 Crow scouts, hastened to intercept them. Following up Clark's Fork of the Yellowstone he surprised their camp, September 4, killed 11 Indians and captured 31, together with 200 horses and mules. Captain Bennett, 5th Infantry, was killed, also the interpreter and one Indian scout. One enlisted man was wounded.

In July, 1879, General Miles, with 7 companies of the Fifth, 2 companies of the 6th Infantry, 7 troops of cavalry, a detachment of artillery and some white and Indian scouts,—the entire command numbering 33 officers, 643 enlisted men, and 143 scouts,—moved against a body of Indians reported to be 2000 strong, who were roaming upon U. S. territory south of the British Columbia boundary line. On the 17th the advance guard had a sharp fight with from 300 to 400 Indians who were driven 12 miles when the advance became surrounded, but the main body moved rapidly forward and the hostiles fled north of Milk River. By July 31st the hostiles had reached Wood Mountain, across the boundary. Attention was then turned to the half-breeds who had been furnishing the hostiles with the supplies of war, and by the 8th of August 829 of them had been arrested. On August 14, Lieutenant Colonel Whistler, with a part of this command, captured 57 Indians with 100 ponies who were on their way from the Rosebud Agency to join Sitting Bull.

On March 3, 1880, Companies I and K, 5th Infantry, left Fort Keogh in pursuit of hostile Indians north of the Yellowstone, and on March 8th, after a continuous gallop of 40 miles, Company K succeeded in surrounding the Indians, capturing 13 ponies and 16 mules.

On the 5th of March Lieutenant Miller, 5th Infantry, with a small party attacked a band of hostiles, killing eight and destroying their camp. The remainder of the band was closely pursued and on March 9, Captain Baldwin overtook them, chased them for 30 miles and captured all their animals excepting those on which they escaped.

In August, 1880, twenty lodges of hostile Sioux surrendered to Company H, and on September 8th, 200 Sioux surrendered to the commanding officer of Fort Keogh.

In December, 1880, as the Indians in the vicinity of Poplar River Agency were becoming turbulent and arrogant, the garrison there was reinforced by five mounted companies of the Fifth, under Major G. Ilges, numbering 180 officers and men, who made the march of 200 miles from Fort Keogh through deep snow, with the thermometer ranging from 10 to 35 degrees below zero. On January 2, 1881, Major Ilges attacked a body of some 400 Indians, located on the opposite side of the Missouri. They fled from their villages and took refuge in some timber, but soon surrendered, the troops meeting with no casualties. On the 12th of February Major Ilges arrested 185 hostiles, 43 of whom were warriors, in the Yanktonnais camp at Red Water. On April 18, 47 men, 39 women, and 70 children surrendered at

Fort Keogh. Many Indians surrendered at other posts, and on July 20, 1881, Sitting Bull, with the last of his followers,—comprising 45 men, 67 women, and 73 children,—surrendered at Fort Buford.

In October Companies A, I and K, marched 175 miles to investigate an alleged interference by whites with friendly Indians.

Hostilities having virtually ceased in Montana with the surrender of Sitting Bull, the regiment was dismounted on the 31st of October, 1881.

On the 15th of December, 1880, Colonel Miles became a brigadier general, and was succeeded by Lieutenant Colonel P. Lugenbeel of the First, who never joined the regiment but was retired February 6, 1882. His retirement promoted Lieutenant Colonel Daniel Huston of the Sixth, who also never joined, but was retired June 22, 1882. Lieutenant Colonel J. D. Wilkins of the Eighth was promoted to fill the vacancy, and served with his regiment until his retirement, August 2, 1886.

Colonel George Gibson, who succeeded him, retired August 5, 1888, and was succeeded by Lieutenant Colonel N. W. Osborne of the Sixth, who is now commanding the regiment.

There is very little to record concerning the service of the regiment in the years following 1881.

The Crows having become turbulent and defiant in 1887, Companies D, E, G and I were sent into the field in October, and were present at the skirmish at the Crow Agency, November 5. They were not engaged and returned to their stations November 25.

On the 1st of June, 1888, after 12 years of service in Montana, the regiment, under Colonel Gibson, left the Department of Dakota for Texas; Headquarters, with Companies B and E going to Fort Bliss; I and K to Fort Davis; C and F to Fort McIntosh; A and G to Fort Ringgold; D to Fort Brown, and H to Fort Hancock.

Here it remained with few changes until May, 1891, when Headquarters with Companies D and E were sent to St. Augustine, Fla.; B and H to Jackson Barracks, La., and C and G to Mount Vernon Barracks, Ala. Later in the year Company F was sent to Fort Sam Houston, Texas, and Company A to Fort Leavenworth, Kansas. These are now (September, 1894) the stations occupied by the regiment.

THE THIRTEENTH REGIMENT OF INFANTRY.*

By Lieutenant JAMES B. GOE, Adjutant 13th U. S. Infantry.

THE 13th United States Infantry was organized by direction of the President, May 14, 1861, confirmed by Act of Congress, July 19, 1861; and reorganized by Act of Congress, July 28, 1866.

Lieutenant Colonel Sidney Burbank assumed command of the regiment, July 23, 1861, and headquarters were established at Jefferson Barracks, Mo., where Companies A, B, C and G of the 1st Battalion were organized. The field officers were Colonel Wm. T. Sherman, Lieutenant Colonel Sidney Burbank, and Majors C. C. Augur, S. W. Crawford, and Charles Hill. Recruiting stations were opened for the regiment at Dubuque, Keokuk and Iowa City, Iowa; Cincinnati and Bellefontaine, Ohio; and Madison, Wisconsin, and Company A of the 1st Battalion was organized October 8, 1861; B, C and G, November 13, 1861; D, E, and F, April 1, 1862.

Philip H. Sheridan was appointed captain in the 13th from a lieutenantcy in the Fourth, May 14, 1861, to fill a vacancy. He joined the regiment, November 10, 1861, but was soon thereafter appointed chief commissary and quartermaster to the Army of Southwest Missouri, which practically severed his connection with the regiment.

On the 12th of February, 1862, the headquarters and so much of the regiment as had been recruited were removed to Alton, Ill., to guard the rebel prisoners confined in the prison at that place.

Headquarters of the regiment were removed, June 12, to Newport Barracks, and on the 4th of September, 1862, the First Battalion left Alton by rail for Newport, Ky., where it was placed on guard at Beechwood Battery and vicinity. In October it was transferred to Memphis, Tenn., and on the 20th of December left that city on the flagboat *Forest Queen* with the expedition against Vicksburg under the command of Major General Wm. T. Sherman, and disembarked six days later on the south bank of the Yazoo River, about 13 miles from its mouth. On the 29th the battalion was ordered to the front and participated in an engagement on the banks of the Chickasaw Bayou, five miles from Vicksburg, and was under a heavy fire of musketry from 7 o'clock A. M., until after dark. The casualties were one private killed and 11 wounded.

On the night of December 31 the battalion embarked on the *City of Alton* and ascended the Arkansas to within three miles of the Post of Arkansas, arriving January 10, 1863. During that night the troops were under the fire of the enemy, and on the afternoon of the 11th, participated in the general assault on the enemy's works, resulting in the capture of the post. The battalion lost one man killed and Captain C. S. Smith and 22 men wounded.

*An abridgment of Lieutenant Goe's History of the 13th Infantry.

The battalion reëmbarked January 14 on the steamer *Forest Queen* and on the 23d arrived at Young's Point, La., three miles below Vicksburg, where it remained, taking part in digging the canal, until March 17, when it accompanied the expedition up Deer Creek to the relief of Admiral Porter, who was near Rolling Fork with a part of his fleet. On the afternoon of the 22d it became engaged and drove the enemy from the vicinity of the gunboats at Black Bayou.

The battalion returned to Young's Point, March 27, where it remained in camp until April 29, when it accompanied the 2d Division of Sherman's Corps on a reconnoissance in force to the right of the enemy's lines, ascending the Yazoo River to the vicinity of Haynes' Bluff, Miss., and returned to camp near Vicksburg, May 1. Embarked the next day for Milliken's Bend, La., and thence, on the 6th, to join the army under General Grant then in Mississippi, accompanying the brigade to Champion Hills and arriving there on the 16th to take part that afternoon in the battle of "Champion Hills" or "Baker's Creek." It then proceeded to Vicksburg, and on the 19th of May participated in the successful assault upon the enemy's fortifications, Walnut Hills, Miss. In this action Captain C. Washington was killed, and of the enlisted men 21 were killed and 46 wounded.

Company E of the 1st Battalion was sent by special train to Dayton, Ohio, for the purpose of arresting C. L. Vallandigham and returned to Cincinnati, May 5, in charge of said prisoner and remained there doing guard duty until May 26, when Captain Alexander Murray, with a guard of 11 men, escorted and delivered him to General Rosecrans. On the 16th of June the company rejoined the 1st Battalion, which was still in camp at Walnut Hills.

On July 4 the battalion left camp to join the expedition under General Sherman, then at Black River. Arriving there on the 6th it crossed the river and proceeded to Jackson, Miss., in front of the enemy's works, where one private was killed and four wounded. It remained at Jackson until the city was evacuated by the enemy,—July 16,—and returned to Camp Sherman, Miss., arriving on the 25th.

The following extract from the proceedings of a Board of Officers convened by G. O. No. 64, Hd. Qrs. 15th A. C., Camp Sherman, Miss., August 5, 1863, shows without further comment the distinguished services rendered by the 13th Infantry in the operations before Vicksburg:

"The Board being organized established the following rules of guidance:

"1. Troops that have participated in a battle or siege with credit, are entitled to its name on their colors.

"2. Art. 1st. The regiment that in force planted its colors on the parapet, and suffered the greatest relative loss, shall have inscribed on its banner, 'First at Vicksburg.'

"Art. 2d. Those engaged with credit, suffering loss, shall have the inscription, 'Vicksburg, Siege and Assault 19th and 22d.' 'Vicksburg, Siege and Assault 19th (or 22d).'

"Art. 3d. Troops in reserve and in the line of circumvallation shall have the inscription, 'Siege of Vicksburg.'

"The Board, after a careful examination of the papers and the evidence submitted

in support of claims, decided unanimously the following commands entitled to the inscriptions appended to their respective titles : * * *

" 1st Battalion, 13th Infantry, Chickasaw Bayou, Arkansas Post, Champion Hills, First at Vicksburg, Jackson.

* * * * * * * * * *

" The Board find the 13th U. S. Infantry entitled to ' First Honor at Vicksburg,' having in a body planted and maintained its colors on the parapet with a loss of 43.3 per cent., including its gallant commander,—Washington,—who died on the parapet. Its conduct and loss the Board, after a careful examination, believes unequalled in the army, and respectfully ask the General Commanding the Department to allow it the inscription awarded."

The battalion left Camp Sherman September 27, 1863, for Memphis, Tenn., where it arrived October 3. When the train bearing the battalion arrived at Collierville, Tenn. (being en route from Memphis to Chattanooga), the battalion commander, Captain C. G. Smith, was informed that an attack was about to be made on the forces stationed there (66th Indiana Volunteers). He immediately ordered the battalion off the cars and formed in line of battle on the road, with two companies deployed on the right and left as skirmishers. When scarcely in position the battalion was attacked by a force of 3150 men commanded by the rebel General Chalmers. A battery of five pieces of artillery opened upon them with grape and solid shot, and the battalion, having no support against artillery at such long range, withdrew to the railroad cut, except the skirmishers, who fell back gradually, having maintained their position for about an hour and a half. The enemy opened a flank fire on the left, and the battalion had therefore to retreat to the rifle pits where the 66th Indiana had been driven, the enemy pursued with overpowering numbers.

Seeing the enemy taking possession of the train and setting fire to it, Lieutenant Griffin with about forty men was ordered if possible to drive the enemy off, put out the fire, and push the train up under cover of the fort. This duty was accomplished in the most brave and gallant manner, whereby the battalion sustained the reputation it had already gained in former engagements. The casualties attending this fight were 15 men killed and 27 wounded.

This battle was fought under the eye of General Sherman who complimented the battalion for its bravery.

After this engagement the battalion proceeded to Corinth, Miss., thence to Chattanooga, November 21.

On July 4, 1863, Colonel Sherman was promoted brigadier general, U. S. Army, and Lieutenant Colonel J. P. Sanderson 15th Infantry, was promoted colonel of the regiment.

The following extracts from General Sherman's memoirs, in which is given his touching letter on the death of his boy Willie, are of special interest to members of the Thirteenth.

" There was a short railroad in operation from Vicksburg to the bridge across the Big Black, whence supplies in abundance were hauled to our respective camps. With a knowledge of this fact Mrs. Sherman came down from Ohio with Minnie, Lizzie, Willie, and Tom, to pay us a visit in our camp at Parson Fox's. Willie was then nine

years old and well advanced for his years, and took the most intense interest in the affairs of the army. He was a great favorite with the soldiers, and used to ride with me on horseback in the numerous drills and reviews of the time. He then had the promise of as long life as any of my children, and displayed more interest in the war than any of them. He was called a "sergeant" in the regular battalion, learned the manual of arms, and regularly attended the parade and guard-mounting of the Thirteenth, back of my camp.

* * * * * *

"I took passage for myself and family in the steamer *Atlantic*, Captain Henry McDougall. When the boat was ready to start Willie was missing. Mrs. Sherman supposed him to have been with me, whereas I supposed he was with her. An officer of the Thirteenth went up to General McPherson's house for him, and soon returned, with Captain Clift leading him, carrying in his hands a small double-barrelled shot-gun; and I joked him about carrying away captured property. In a short time we got off. As we all stood on the guards to look at our old camps at Young's Point, I remarked that Willie was not well, and he admitted that he was sick. His mother put him to bed, and consulted Dr. Roler, of the Fifty-fifth Illinois, who found symptoms of typhoid fever. The river was low; we made slow progress till above Helena; and, as we approached Memphis, Dr. Roler told me that Willie's life was in danger, and he was extremely anxious to reach Memphis for certain medicines and for consultation. We arrived at Memphis on the 2d of October, carried Willie up to the Gayoso Hotel, and got the most experienced physician there, who acted with Dr. Roler, but he sank rapidly, and died the evening of the 3d of October. The blow was a terrible one to us all; so sudden and so unexpected, that I could not help reproaching myself for having consented to his visit in that sickly region in the summer time. Of all my children, he seemed the most precious. Born in San Francisco, I had watched with intense interest his development, and he seemed more than any of the children to take an interest in my special profession."

"GAYOSO HOUSE, MEMPHIS, TENNESSEE,

"October 4, 1863—Midnight.

"Captain C. C. Smith, commanding Battalion Thirteenth United States Regulars.

"My Dear Friend: I cannot sleep to-night until I record an expression of the deep feelings of my heart to you, and to all the officers and soldiers of the battalion for their kind behavior to my poor child. I realize that you all feel for my family the attachment of kindred, and I assure you of full reciprocity.

"Consistent with a sense of duty to my profession and office, I could not leave my post, and sent for the family to come to me in that fatal climate, and in that sickly period of the year, and behold the result; the child that bore my name, and in whose future I reposed with more confidence than I did in my own plan of life, now floats a mere corpse, seeking a grave in a distant land, with a weeping mother, brother, and sisters, clustered about him. For myself I ask no sympathy. On, on I must go to meet a soldier's fate, or live to see our country rise superior to all factions, till its flag is adored and respected by ourselves and by all the powers of the earth.

"But Willie was, or thought he was, a sergeant in the Thirteenth. I have seen his eye brighten, his heart beat, as he beheld the battalion under arms, and asked me if they were not real soldiers. Child as he was, he had the enthusiasm, the pure love of truth, honor and love of country, which should animate all soldiers.

"God only knows why he should die thus young. He is dead, but will not be forgotten till those who knew him in life have followed him to that same mysterious end.

"Please convey to the battalion my heartfelt thanks, and assure each and all that if in after years they call on me or mine, and mention that they were of the Thir-

teenth Regulars when Willie was a sergeant, they will have a key to the affections of my family that will open all it has; that we will share with them our last blanket, our last crust!

"Your friend,
(Signed) "W. T. SHERMAN,
"*Major General.*"

Over Willie's grave in Calvary Cemetery, near St. Louis, is erected a beautiful marble monument, designed and executed by the officers and soldiers of the 1st Battalion, 13th Infantry, which claimed him as a sergeant and comrade.

The battalion was in reserve at the battle of Mission Ridge, November 24, and on the 26th marched to Graysville, Ga., in pursuit of Bragg. Continuing the march on the 27th the battalion reached Maysville, December 6. The return march began December 7, reaching Chattanooga, December 17; Bellefonte, Ala., December 31, and Huntsville, Ala., January 5, 1864. On April 4 the battalion was transferred to Nashville, Tenn., where it was detailed as special guard to General Sherman's headquarters, which duty it continued to perform until the close of the year, being encamped at Edgefield, about two miles from Nashville, Tenn. It remained at this point until July 13, 1865. On October 14, 1864, Colonel Sanderson died at St. Louis, while on detached service as provost marshal of Missouri, and was succeeded by Colonel I. V. D. Reeve.

The headquarters of the regiment moved from Newport Barracks, May 10, 1865, to Camp Dennison, Ohio, where Companies A and B, 2d Battalion, were organized during that month, and Companies C, D, E, F, G and H, in July. On July 13 the 1st Battalion left Nashville for St. Louis, arriving on the 20th; thence August 24, to Fort Leavenworth, where it arrived August 31. Companies A, B, D, E and G went on to Fort Riley, September 5, arriving on the 18th.

During November, 1865, the headquarters of the regiment were moved to Fort Leavenworth. The 2d Battalion left Camp Dennison in August for Jefferson Barracks, where it arrived September 5, but left for Fort Larned, Kansas, via Fort Leavenworth, in November, reaching that post in December. While en route, Company D was detached for duty at Fort Ellsworth, and Companies B and E ordered to take post at Fort Zarah, Kansas. Companies A, B and C, 3d Battalion, were organized at Jefferson Barracks during January, 1866, and Companies F, G and H, in March.

The companies of the 1st Battalion at Fort Riley left that post April 11 for Fort Leavenworth, where they were joined by the remaining companies and proceeded up the Missouri River to establish a military post north of the Black Hills, D. T.; but on arriving at Fort Sully on the 27th, they reëmbarked under orders to establish a new post at or near Fort Benton, M. T., arriving at and establishing Camp Cooke, M. T., May 19.

The 2d and 3d Battalions concentrated at Fort Leavenworth, and during May proceeded to the District of the Upper Missouri. The headquarters of the regiment left Fort Leavenworth, May 1, and arrived at Fort Rice, D. T., May 16. The 2d Battalion was distributed as follows: Headquarters and Companies A and B at Fort Randall; C, E and H, at Fort Sully; G at

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Fort Thompson; F at Fort James, and D at Fort Dakota, all these stations being in Dakota. The headquarters of the 3d Battalion were established at Fort Rice with Companies B, E, F, G and H. A was at Fort Sully, C at Buford, and D at Berthold.

Company F, 1st Battalion, was detached from Camp Cooke during September for the purpose of establishing a mail route between Helena, Montana, and that post.

Pursuant to General Order 92, A. G. O., received December 28, the 2d and 3d Battalions, 13th Infantry, were transferred respectively to the 22d and 31st Regiments of Infantry. Companies I and K of the regiment were organized at Governor's Island, N. Y. H., during October, 1866.

The regimental return for January, 1867, shows the following roster of commissioned officers: Colonel I. V. D. Reeve; Lieutenant Colonel G. L. Andrews, and Major William Clinton.

Captains R. S. LaMotte, N. W. Osborne, Robert Nugent, A. B. Carey, Wm. C. Ide, E. W. Clift, F. E. DeCourcy, R. A. Torrey, and Robert Chandler.

First Lieutenants Patrick Meagher, J. L. Horr, T. J. Lloyd, Wm. H. Keeling, J. D. Graham, J. M. Green, J. T. McGinnis, A. N. Canfield, and J. S. Stafford.

Second Lieutenants M. O. Codding, O. A. Thompson, E. H. Townsend, H. C. Pratt, Wm. Auman, W. I. Sanborn, J. B. Guthrie, and Thomas Newman.

Regimental Headquarters were at Fort Rice till June, 1867, then at Camp Cooke till August 11, then at Fort Shaw until sent to Camp Douglas, Utah Ter., June 11, 1870.

At Camp Cooke, May 17, 1868, hostile Indians (Sioux and Crows), numbering about 2500, surrounded and attacked the post at about one o'clock P. M., the attack being continued without intermission until 7 o'clock, when the Indians were driven off, carrying with them their dead and wounded. The garrison at this time consisted of Companies B and H, 13th Infantry, under the command of Major Clinton. The troops during the engagement were commanded by Captain DeCourcy. Fearing that the garrison might fall into the hands of the Indians, the wives of the officers requested that they be placed in the magazine and that the magazine be fired in the event of the capture of the post, in order that they might be saved from falling into the hands of the savages.

Captain Wm. Auman (then a 1st lieutenant), in addition to being in command of B Company was the post quartermaster, and when the Indians appeared his first thought was to secure the government animals which were grazing a quarter of a mile from the post. Armed with a rifle he proceeded to the corral, mounted a horse, and accompanied by one of the teamsters rode out and secured the animals while the hostile Indians were within two hundred yards of the herd. After the animals had been put in the corral he went where one of the field pieces had opened fire, and finding that the piece was loaded with shell the fuse of which was uncut, he cut one fuse with his pocket knife and started for the magazine for a fuse knife. At this juncture he received a bullet wound in the left foot, the ball passing through the instep and causing a most painful and serious wound.

On May 19, 1868, a command made up of detachments from Companies B, E and H, under Captain Nugent, was engaged with Indians at the mouth of the Muscleshell River, Dakota; and on the 24th a portion of this command under Lieutenant Canfield met and had a skirmish with the hostiles near the mouth of the Muscleshell.

At Fort Buford during the years 1869 and 1870, the garrison consisted of Companies C, E and H, 13th Infantry, under the command of Lieutenant Colonel H. A. Morrow, and during the period referred to, attacks by and skirmishes with hostile Sioux Indians were of daily occurrence, so much so, in fact, that General Sheridan in 1869 reported that Fort Buford was in a state of siege. About July 24, 1869, four citizens were killed by Indians near the post, and in June, 1870, two more citizens were killed and six wounded. As the Indians always carried off their killed and wounded, it was impossible to ascertain the extent of the injury inflicted upon them, but they must have lost several, both in killed and wounded, during their almost daily attacks. Sitting Bull was the greatest enemy during this time and attempted several attacks, but was always frustrated by information received from his camp through one of the Indian scouts named Bloody Knife (Ta-Me-Na-Way-Way), who was afterwards killed in the Custer massacre.

In the reduction and consolidation of 1869 all the field officers of the regiment were changed. Colonel Reeve was replaced by Colonel P. R. De-Trobriand, recently of the 31st; Lieutenant Colonel Andrews by Lieutenant Colonel H. A. Morrow, recently of the 36th; and Major Clinton by Major R. S. LaMotte, recently of the 12th.

On the 12th of March, 1869, Captain Clift left Fort Ellis in command of a party consisting of Lieutenant W. L. Wann, 34 enlisted men of the Thirteenth, and 10 volunteer citizens in pursuit of hostile Indians. On the 13th the bodies of two men were found, stripped and mutilated in the most horrible manner. A small party was sent up the river in search of the cattle which the unfortunate men had been herding, and the following is an extract from Captain Clift's report of the subsequent operations of his command:

"Before the detachment sent up the river had returned, I discovered a party of Indians coming from the south side of Sheep Mountain, and others between Sheep and Crazy mountains. I then took a position on rising ground to the west of the river to await the return of the detachment sent above, and also to ascertain something of the strength of the Indians. I could see them in large numbers on all sides of Sheep Mountain. Those in advance came down to the river (the water was very shallow) and endeavored by every means to induce me to cross. Seeing that they were in force and far better mounted than ourselves I declined their invitation. Out of the 35 horses in my command, only four or five could be of the slightest use in following them.

"The Indians lost no time in crossing and the fight commenced at once. The ground was broken into ravines, ledges and small knolls on all sides which afforded them cover, consequently I changed my position several times and thus obliged them to expose themselves in moving from point to point. The fight was kept up in this manner for four hours, when the Indians withdrew. Most of my horses were now so broken down that I was unable to follow.

"In the engagement the Indians had four men and two horses killed. Our loss was only one horse. The Indians were mounted on fine American horses and in their

dress and actions resembled the Sioux or Nez Perces more than other tribes in this section of the country. I know of no others who are so brave and well mounted."

Captain Clift went out again in less than a month, and, under date of April 10, 1869, reports as follows:—

"I have the honor to report that, pursuant to your instructions of the 5th inst., I left the post that evening with a detachment consisting of one lieutenant, one surgeon, one sergeant, two corporals and 40 men, * * * and proceeded to the residence of Judge Sheels where I was joined by several citizens from the valley. I learned that on the night of the 4th inst. seven head of cattle and one horse had been driven off. We found their trail and followed it to the foot of the mountains about two miles north of the Flathead Pass. * * * From this point I took the trail of the Indians and followed it over an almost impassable country until about noon on the 7th inst. Those in advance came in sight of the Indians near a mountain on the north fork of Sixteen-mile Creek and near the headwaters of the Muscleshell River. The party consisted of 13 Indians, two of whom made their escape with the horse they had taken. * * * The eleven remaining took to a mountain about 1500 feet between them and the creek. The mountain was a narrow ridge and could only be ascended at two ends. On the north side the comb of rock was at least 100 feet in height perpendicularly; on the south side it was not so abrupt.

"I immediately divided the party, leaving a few below on the north side, and they ascended both from the east and west ends. The Indians could be plainly seen on the peak of rocks, defying us in the most insulting manner. The position chosen by the Indians afforded them complete shelter and at the same time commanded the mountain on all sides. There were three holes on the summit around which they built up walls, leaving port-holes through which they kept up an incessant fire. We got to within 150 yards on each end and worked for two hours to dislodge them but with no effect. Finding that there was no resource left except by assault, I directed Lieutenant Thompson to lead the men on the east, while I would direct on the west end. As soon as Lieutenant Thompson could get around to his position the assault was made from both sides, and in a few minutes we had the satisfaction of putting an end to the affair. * * * We killed nine Indians on the spot. They were all armed with rifles and revolvers, and had an abundant supply of ammunition.

"The casualties on our side were one private killed and two badly wounded. Two citizens were wounded.

"When all did so well it is difficult to particularize. Lieutenant Thompson conducted his part of the action in a manner highly satisfactory. Surgeon C. Ewen attended to the wounded in the best possible manner. Sergeant J. P. Sullivan, Company G; Corporal B. Sheridan, Company D; Private C. Thompson, Company F; Citizen T. King and two others, names unknown, were conspicuous for daring and bravery. Private Conry, who died so nobly at the same instant with his antagonist, should be remembered. I suggest therefore that the mountain upon which the engagement took place be named after him."

The modesty of this report is characteristic of that gallant and capable officer. As a matter of fact he was personally engaged in hand-to-hand conflict with the Indians, and when his revolver ammunition was exhausted, he began using rocks for offensive purposes. Captain Clift continued to serve in the 13th Infantry till October, 1884, when he was retired on account of disability, dying of paralysis two years later at his home in Detroit.

On the morning of the 19th of January, 1870, Captain R. A. Torrey, with all the available men of his company (A) and ten men each from Com-

panies F, I and K, left Fort Shaw en route to the Marias River, as guard to the wagon train of a battalion of the 2d Cavalry under the command of Major E. M. Baker, 2d Cavalry. In addition to Company A as strengthened, Captain G. H. Higbee with a mounted detachment of the 13th Infantry also accompanied this expedition against the Piegan Indians. When the command arrived in the vicinity of the hostiles, Lieutenant Waterbury, 13th Infantry, who was with Captain Higbee's mounted force, was ordered to proceed with a detachment and capture a herd of ponies near the Indian camp. He promptly executed this order, securing all the animals, and rejoined the column to take part in the encounter with the Indians. In this engagement the percentage of loss sustained by the Piegans was heavy. The troops returned to Fort Shaw January 28. Captain Torrey's command remained as guard to the wagon train during the fight.

October 24, 1871, the headquarters of the regiment were changed from Camp Douglas to Fort Fred Steele, Wyo., returning to Camp Douglas November 25, 1873.

August 17, 1872, Companies C, F and I, comprising part of an expedition against hostile Indians in southern Utah, proceeded from Camp Douglas to the scene of hostilities. The battalion returned to the post September 7. No casualties.

The 13th Infantry was relieved from duty in the Department of the Platte, October 10, 1874, and ordered to New Orleans, taking station at Jackson Barracks, the entire regiment, under Lieutenant Colonel H. A. Morrow, arriving during the month of October.

Headquarters and Companies D, E, H, I and K, while en route to New Orleans, met with a railroad accident on the Mobile and Ohio R. R., between Dyer and Trenton, Tenn., the train going off the track. Four freight cars were smashed and four passenger cars disabled. One corporal and one private of Company K were killed; two privates of Company I and two of Company K injured. The records of Company I and a large amount of officers' baggage were destroyed.

The regiment moved into the city of New Orleans, November 1, 1874, where it was employed preserving the peace during the McEnery-Kellogg election riots of that year.

The regiment continued to serve in the Department of the South for six years, portions of it being stationed at different times at New Orleans, Baton Rouge, Vicksburg, Holly Springs, Little Rock, Atlanta, Mt. Vernon Barracks, Chattanooga, Lake Charles, Mississippi City, and other points in the Department of the South.

During the railroad strikes and labor riots of the summer of 1877 all the companies of the regiment, except D and G in Calcasieu Parish, La., were on duty at Pittsburg, Scranton, Wilkesbarre, and other points in Pennsylvania.

During the summer and fall of 1878 the South was scourged by the most terrible epidemic of yellow fever that has occurred for years. Thousands had perished from the disease. The suffering and destitution of the inhabitants of the lower Mississippi valley, especially between Memphis and Vicksburg, was so great that the National Relief Commissioners determined to send relief. By the coöperation of various cities of the North a fund of

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$20,000 was raised and large quantities of merchandise were secured. The funds thus raised were expended in the purchase of an assorted cargo of provisions, clothing, bedding, medicines and ice, and the steamer *John M. Chambers* was chartered to leave St. Louis early in October to carry these supplies for distribution to the yellow fever sufferers along the Mississippi River. But who was to assume charge of the expedition and undertake the great responsibility and personal danger attending the execution of this mission? Who were to officer this boat and, taking their lives in their hands, deliberately face almost certain death in order to give aid to the destitute? For it meant death to the unacclimated.

The Secretary of War telegraphed General Augur, commanding Department of the South, to know if any officers of his command would volunteer for this perilous duty. Quickly came the response that Lieutenant H. H. Benner, 18th Infantry, and Lieutenant C. S. Hall, 13th Infantry, had volunteered to go with the relief boat. Lieutenant Hall had left his camp and started to go to his home on a three months leave of absence, but he relinquished that and offered his services. The history of the army does not contain the record of any more heroic and truly unselfish act than that of of these two officers. It cost Lieutenant Benner his life.

Regimental General Order No. 8, of date February 1, 1879, shows the estimation in which Lieutenant Hall's gallant conduct was held by his commanding officer, and it may truly be said that this order also voiced the sentiments of the whole nation:

Second Lieutenant Charles S. Hall, 13th Infantry, having reported for duty with his company on his return from detached service, it affords great pleasure to the Colonel Commanding to welcome him back and to congratulate him upon his noble conduct and important services last summer, during the disastrous epidemic which carried death and desolation along the Mississippi River. After tendering voluntarily his coöperation to the dangerous undertaking of carrying supplies of all sorts on a steamboat chartered especially for that purpose, and of distributing them at the points where the yellow fever was most fatal and causing the greatest destitution and suffering, Lieutenant Hall, by the death of Lieutenant Hiram H. Benner, 18th Infantry, found himself in command of the expedition with all its dangers and responsibilities. He faced both with a brave heart and an intelligent determination, and fulfilled his perilous position in a manner worthy of praise and admiration.

Such a noble achievement does great honor to this young officer and reflects credit upon the regiment to which he belongs. It deserves special acknowledgment, which the Colonel Commanding is happy to tender to Second Lieutenant Charles S. Hall, with his thanks and those of all the officers of the 13th United States Infantry.

March 25, 1879, Colonel DeTrobriand was retired. This promoted Lieutenant Colonel J. R. Brooke, who transferred with Colonel Luther P. Bradley, the latter becoming the colonel of the Thirteenth.

In June, 1880, the regiment was ordered to New Mexico, Headquarters and Companies F, G, H, I and K, taking station at Fort Wingate. The remaining five companies, under Lieutenant Colonel R. E. A. Crofton, marched from Santa Fé to southern Colorado for the purpose of building a new post on the Mancos River. The location for this was changed by the Department commander, and the new post of Fort Lewis, Col., was built on the La Plata River during the ensuing eighteen months.

During the years 1880 and 1881, Captain B. H. Rogers' company of mounted infantry (Company C of the 13th, stationed at Fort Lewis), did a large amount of scouting in southwestern Colorado and southeastern Utah. At this time the renegade Pah-Utes were committing all sorts of depredations in that section. Captain Rogers rendered most efficient service in his operations against these Indians, succeeded in putting an end to their incursions, and reëstablished the settlers on their lands.

In 1882, Captain J. B. Guthrie, commanding Company A, took part in a scout after Apaches from Fort Cummings. On April 22 the company took part in an engagement with the Indians in which several men of the 4th Cavalry were killed and wounded.

The Thirteenth spent eight years of varied and arduous duty in New Mexico, participating in numerous operations against Indians, especially in the campaign against Geronimo.

Since June, 1888, the regiment has served in the Indian Territory. Headquarters were at Fort Supply until January 4, 1893, since which time they have been at Fort Sill, Oklahoma.

Companies I and K were skeletonized in August, 1890.

Colonel Luther P. Bradley was retired December 8, 1886, and was succeeded by Colonel Robert S. LaMotte, promoted from the Twelfth.

Colonel LaMotte died at Fort Supply, December 16, 1888, and was succeeded by Colonel Montgomery Bryant, promoted from the Eighth, whose service as captain and major had all been with the Thirteenth. Colonel Bryant was retired at his own request, March 1, 1894, and was succeeded by Colonel Alfred T. Smith, promoted from the Eighth.

In a paper of this kind relating as it does exclusively to the historical record of the regiment as a distinct organization, and written partly with the object of affording information to the younger officers of the regiment, it is greatly to be regretted that the splendid services of those officers now in the regiment who served in the volunteers during the war cannot be fully set forth here. This state of affairs is due of course to the fact that the old officers of the 13th, as it was during the Rebellion, having passed from the scene of action, their places are filled by those whose war records were made with other organizations.

The following is an extract of a letter from Lieutenant General Sherman, published in General Order No. 6, dated Headquarters 13th Infantry, May 27, 1875:—

"I have always felt the warmest friendship and the keenest pride in the records and high military standard of the 13th Infantry, and I know that wherever it may be called upon to pitch its tents, the officers and men will be governed by such a high sense of professional duty as will make it a distinguished honor to the General of the Army to have been its colonel, and to the Lieutenant General to have been one of its captains."

NOTE.—The writer is under obligations to Major F. E. DeCourcy, U. S. A., Captains William M. Waterbury, William Auman, Benjamin H. Rogers, and Jesse C. Chance, 13th Infantry, for much useful information relating to the history of the regiment; and to Private Frank Cooper, Company E, 13th Infantry, for valuable assistance in obtaining necessary data from the regimental records.

XUM

THE TWENTY-THIRD REGIMENT OF INFANTRY.

By Lieutenant J. K. THOMPSON, 23d U. S. Infantry.

BY the Act of Congress approved June 26, 1812, twenty-five regiments of infantry were provided for. Where the 23d Regiment was recruited is at present in doubt, but it is thought that it was recruited by Major J. R. Mullany near Canandaigua, N. Y. It took part during the three years of the war of 1812 in many of the battles and campaigns in New York and Canada.

By the Act of Congress approved March 3, 1815, the army was reduced and the 23d Infantry was consolidated with the 6th, 16th, 22d and 32d, to make the present Second Infantry.

Pursuant to the President's proclamation of May 4, 1861, confirmed by Act of Congress approved July 29, 1861, the Fourteenth U. S. Infantry was organized. Its second battalion was recruited at Fort Trumbull, Conn., under Lieutenant Colonel (afterwards Major General) John F. Reynolds, in the summer of 1861, but on April 30, 1862, its title was changed from the Second to the First Battalion, Company C of the Third becoming C of the Second Battalion.

The new second battalion was recruited at Fort Trumbull, Conn., under Major G. R. Giddings, in the spring of 1862, and this battalion now constitutes the 23d Infantry.

In May, 1862, the 2d Battalion, 14th Infantry, joined a provisional division under General Sturgis in the defenses of Washington, and until June 30 was camped at Tenally Town, D. C., and Clouds Mills, Virginia. July 1, 1862, the 2d Battalion was embarked on schooners and sent via the Potomac River, Fort Monroe and the James River to join the 1st Battalion. It joined at Harrison's Landing July 5, 1862, where Captain (afterwards brigadier general) D. B. McKibbin was assigned to its command.

From this time on, it, or some of its companies with the rest of the 14th Infantry, formed part of the 5th Corps which took its share in the campaigns and battles of the Army of the Potomac. The history of the 14th Infantry has already been well told by Colonel T. M. Anderson in the Journal of The Military Service Institution of July, 1890.

In the last week in July, 1865, the 2d Battalion, under the command of Major Louis H. Marshall, sailed from New York City via Aspinwall en route to San Francisco, where it arrived about the 1st of September, and a fortnight later was sent to the Department of Columbia with headquarters at Vancouver.

The Act of Congress approved July 28, 1866, reorganized the army, and by the following general order, the 2d Battalion of the 14th became the 23d Regiment of Infantry:

"I. Under the act of July 28, 1866, the designation and organization of the regi-

ments by which the military peace establishment is increased and fixed will be as follows: The provisions of this order are in accordance with the condition of the army on, and are of effect from the 21st day of September, 1866.

"II. The 10 old regiments of infantry will retain their designation. The 1st battalion of the 3-battalion regiments will retain the designation of the regiment to which they belong and under the new organization will be the 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th regiments of infantry. * * *

"The 2d battalions of the same regiments will under the new organization become respectively the 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th regiments of infantry. * * * "

Companies "I" and "K" were organized at Davids Island, New York Harbor, by Orders No. 177, G. R. S., New York City, December 10, 1866, and these companies, under the command of 1st Lieutenant (now Captain) O. W. Pollock, left New York City, December 11, 1866, for Aspinwall, en route to San Francisco. They arrived at San Francisco, December 31, 1866, and were stationed about San Francisco harbor until March, 1867, at which time they were sent to join the regiment in the Department of the Columbia.

Since 1867 the companies of the regiment have been stationed in Oregon, Alaska, Washington, Idaho, Arizona, Wyoming, Nebraska, Kansas, Colorado, Indian Territory, New York, Michigan and Texas, and during this time parts of the regiment have taken part in numerous Indian scouts and a number of Indian fights.

By the provisions of G. O. 76, A. G. O., July 21, 1890, companies I and K were skeletonized, and the regiment, now composed of eight companies, is at present stationed at Fort Sam Houston and Fort Bliss, Texas.

The following is a list of the 14 battles and engagements in which a part or the whole of the 23d Infantry was engaged during the War of 1812–15:

Queenston Heights, October 13, '12; Black Rock, November 28, '12; Fort George, U. C., May 27, '13; Stony Point and Sacketts Harbor, N. Y., May 29, '13; Stony Creek, U. C., June 6, '13; Beaver Dams, U. C., June 24, '13; Out Post affair, Fort George, U. C., August 24, '13; La Colle Mill, Canada, March 30, '14; Fort Erie, U. C., July 3, '14; Chippewa, U. C., July 5, '14; Lundy's Lane (Niagara Falls), July 25, '14; Assault on Fort Erie, U. C., August 15, '14; Siege of Fort Erie, U. C., August 15 to September 17, '14; Sortie from Fort Erie, September 17, '14.

(*Disbanded May 17, 1815.*)

The following is a list of the 39 battles and engagements in which the whole or a part of the 2d Battalion, 14th Infantry, and the whole or a part of the 23d Infantry were engaged:

Siege of Yorktown, Va., April 4 to May 4, '62; Gaines Mills, Va., June 27, '62; Malvern Hill, Va., July 1, '62; 2d Bull Run, Va., August 29 and 30, '62; Antietam, Md., September 17, '62; Snickers Gap, Va., November 3 and 4, '62; Fredericksburg, Va., December 13, '62; Chancellorsville, Va., May 2, 3 and 4, '63; Gettysburg, Pa., July 2 and 3, '63; Wilderness, Va., May 5, '64; Laurel Hill, Va., May 8 to 13, '64; Spottsylvania, Va., May 14, '64; North Anna River, Va., May 24, '64; Bethesda Church, Va., June 1 and 3, '64; Petersburgh, Va., June 18 and 21, '64; Weldon R. R., Va., August 19 and

21, '64; Chapel House, Va., October 1, '64; Hatchers Run, Va., October 27, '64; Jordan Creek, Oreg., February 23, '66; Owyhee Cañon, Idaho, May 27, '66; Battle Creek, Idaho, July 6, '66; Near Camp C. F. Smith, Oreg., November 1, '66; South Fork Malheur River, Oreg., July 15, '67; Infernal Caverns, California, September 25 to 27, '67; Dunder and Blixin Creek, Oreg., March 14, '68; Near Camp Three Forks, Owyhee, Idaho, April 17, '68; South Warner Mountains, Oreg., April 29, '68; Snake Cañon, Idaho, June 9 and 24, '68; Battle Creek, Idaho, June 24, '68; Juniper Cañon, Idaho, July, '68; Little Salmon River, Idaho, July 22, '68; Near Camp Three Forks, Owyhee, Idaho, July 24 to August 2, '68; Juniper Mountains, Idaho, August 8 to September, '68; Red Rock Mountains, Arizona, December 11, '72; Mazatzal Mountains, Arizona, December 13, '72; Mazatzal Mountains, Arizona, May 9 and 26, '74; Tonto Basin, Arizona, February and March, '73; Head of Cave Creek, Arizona, March and April, '73; Grace Creek, Nebraska, April 28, '76.

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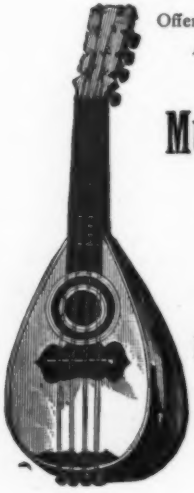

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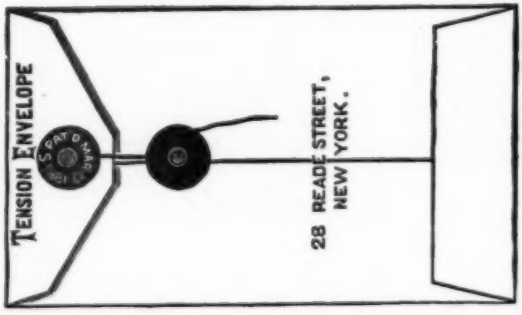

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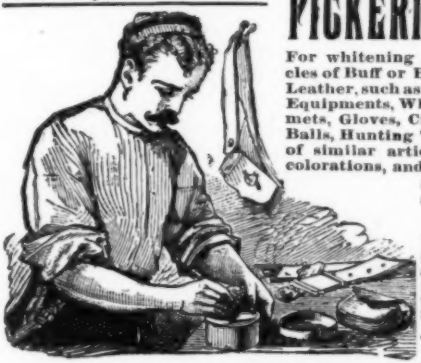

For whitening all articles of Buff or Buckskin Leather, such as Military Equipments, White Helmets, Gloves, Cricket and Tennis Shoes, Tennis Balls, Hunting Thongs, Whips, and a multitude of similar articles. Removes stains and discolorations, and ensures evenness of color, and a soft, silky surface of glossy satin-like appearance.

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The best balanced Cereal Product for the rational nourishment of children and convalescents. A sample and comparative table showing analyses of several leading Infant Foods, furnished free or a pound package by mail or express on receipt of sixty cents.

Dr. J. J. Sullivan, of New York City, in his "Diet After Weaning," says:

As a rule the weaning of a child should be commenced when the process of teething is fairly established. As soon as nature provides the child with teeth it is better for both mother and child that it be weaned. The infant should not, however, be weaned from the breast in too sudden a manner, as any abrupt change of diet is very apt to derange the digestive organs and give rise to diarrhœa or cholera infantum.

The diet of infants at this particular period of life has received a large share of professional attention during the past ten years. Foods of various kinds have been introduced into the market, and I have thoroughly tested them all. I have found Schumacher's Infant Food to be the most perfect and rational food that has ever been introduced to the profession. It has by far the largest percentage of albuminoids—brain and muscle making material. It is palatable, nutritious, and wholesome, and does not overtax the digestive organs of young children, producing those disturbances of the stomach that usually attend the early months of life. It acts not only as a food, but as a corrective medicine, and prevents those troubles of the bowels known as colic, summer complaint, etc.

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FOR THE TABLE.

STRONGEST. PUREST. BEST.

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Cut some Ivory Soap quite small,
Pour hot water on it all;
When the suds are pretty cool
Wash a single piece of wool.
Knead it gently with the hand,
Rub no soap on, understand.
Never rinse in water plain
Nor in cold. In suds again
Blue it well and keep it warm,
Cold alone does flannels harm.
Use a wringer. Never let
Any woolen goods stay wet.
So dry quickly, and we think
That your flannels will not shrink
But will all be soft and fine
When you take them from the line.

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United States and Canadian Government Reports.

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The United States Official Investigation of Baking Powders, made under authority of Congress, shows the Royal Baking Powder to be a cream of tartar baking powder of the highest quality, superior to all others in strength, leavening power, and general usefulness.

(*Bulletin 13, Ag'l Dep't, p. 599.*)

Department
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The Canadian Official Tests, recently made, commend the Royal Baking Powder as of highest excellence, and show it to be highest of all in leavening strength.

(*Bulletin 10, p. 16, Inland Rev. Dep.*)